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| *PERCENT REMAINING ANTIOXIDANT | ANTIOXIDANT B-L-E | ANTIOXIDANT "X" |
|---|---|---|
| Unaged | 100 | 100 |
| Aged 72 hours in Oxygen Bomb | 67 | 44 |
| Aged 144 hours in Oxygen Bomb | 50 | 19 |
| Aged 288 hours in Oxygen Bomb | 19 | 6 |

*Determined by procedure reported by L. H. Howland and E. J. Hart—"Analysis of Rubber for Antioxidants." Presented at Boston Meeting, A.C.S., September 15, 1939.

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The RUBBER AGE

VOL. 47, No. 4 JULY, 1940

# Latex in Paleontology

By JAMES H. QUINN

*Assistant in Paleontology,*
*Field Museum of Natural History*

RUBBER has long been indispensable in a number of fields but until it became available in liquid form it could not be utilized in many branches of museum preparation. Shortly thereafter, museum technicians began experimenting with it and as a result certain formerly difficult processes have been simplified and improved. One of these, the technique of making casts by means of rubber molds, is described in this article. The discussion is limited to casting bones of fossil animals but the technique has, of course, a much wider application.

The great advantage of liquid rubber (latex), as a molding material, is that when properly used it produces molds which will yield casts combining accuracy of size and form with almost perfect reproduction of surface detail. The importance of these qualities, which are exceedingly difficult to obtain with other molding materials, may be explained by a brief account of the uses of casts in museum work.

Museums, particularly the larger ones, have the twofold function of disseminating knowledge through public exhibition, lectures and publications and of increasing knowledge through research and exploration in those branches of science that come within their scope. Both sorts of activity are made possible by the possession and accumulation of specimens obtained by expeditions, gifts or exchanges.

In the science of zoology, the number of specimens representing a particular kind of animal can usually be increased by additional collecting. In paleontology, the science dealing with the remains of extinct animals, this is unfortunately not the case. A great many of the known fossil animals are represented by only one or two specimens and but few of them are found in any quantity.

Due to accidents of preservation and exposure it is often doubtful if the number of specimens pertaining to a group will be increased by further collecting in localities where they have been obtained. Even in those cases where the remains of a particular type of animal are preserved in some abundance, the fact that nearly all fossil bones are imperfectly and incompletely preserved, a jaw here and part of a skull there, renders it probable that knowledge of the animal in question will rest on a series of specimens, incomplete in themselves but supplementing one another. These specimens, which are likely to have been collected by various museums over a long period of years, form the subjects of detailed publications in which descriptions, illustrations and measurements are given.

Distribution of such publications is a method of disseminating knowledge regarding fossils. Their value and usefulness may be immeasurably increased by making and distributing casts of the specimens to which the publications pertain so that they may be made available for examination to any number of students of paleontology. Furthermore, they may be used in exhibition to supplement incomplete specimens and

*First: Applying the plasteline walls.*
*Second: The initial coating of rubber.*

to fill in gaps in series of specimens intended to illustrate relationships, evolutionary trends and the like.

It will, therefore, be readily apparent that in order to adequately serve such purposes, casts must be made as accurate and realistic in appearance as it is possible to make them. Discrepancies in size and appearance between a cast and the published illustrations and measurements of the original will obviously tend to discredit the accuracy of both in the mind of the examiner.

Large scale distribution of accurate casts has been impeded by the fact that it is most difficult to produce them by means of familiar molding materials. Without going into details it may be said that the use of all such materials presents difficulties of one sort or another and entails, not only considerable labor, but also a high degree of skill and much experience on the part of the molder. It is furthermore almost impossible to make accurate casts of minute specimens. Larger objects can be reproduced with greater accuracy of form, but the necessity of employing separating agents during the molding and casting processes obscures or obliterates much of the surface detail of the original. The perfection of a technique for making molds of rubber has largely removed these obstacles to cast making and presages an increased interest in casts among paleontologists.

The possibility of using rubber as a molding material was brought to our attention in 1934. At that time we were engaged in making casts of the brain cavities of certain fossil skulls and were dissatisfied with the results we were obtaining with a flexible material made from glue. Mr. Frank H. Letl of the Department of Zoology supplied us with a quantity of vulcanized latex which he thought would be usable for the purpose. This was immediately found to be the case, and the casts were prepared in the following simple way:

The liquid rubber was poured into the cavities, distributed by rotating the skulls and the excess rubber drained off. Several such applications were required to obtain a film of sufficient thickness. After drying for a few days the flexible casts were loosened and removed through the opening for the spinal cord or in some instances through an opening made by removing a section of the wall of the brain case. The structural details of the inside of the brain cavities such as the impression left in the bone by various blood vessels, the courses of certain of the sulci (furrows) of the brain and the exits of the various cranial nerves were perfectly preserved on the casts.

The ease with which this previously difficult operation was accomplished naturally led us to experiment with latex as a molding material. It was found to be easy to apply; no separating agents were necessary and

*Third: Applying thin cement to edges.*
*Fourth: Pouring the plaster into mold.*

*Fifth: Spreading plaster by rotation.*
*Sixth: Separating mold from specimen.*

there was little risk of damage to the specimens. The casts were pleasing in appearance and preserved the most delicate surface details. Unfortunately they were sometimes as much as ten per cent smaller than the originals and were not always accurate as to form. The cause of these defects was revealed by a study of the properties and characteristics of latex, in both the liquid and solid state, and the effects resulting from solidification.

Liquid rubber (latex) contains a large amount of water which is nearly all lost in drying. Coagulation of the rubber occurs very early in the drying process so that most of the reduction in the volume of the rubber film, caused by the loss of water, occurs *after* the liquid rubber has lost the property of fluidity. Since the film tends to reduce its volume in every direction, and since the object over which the mold is formed prevents any reduction in dimension, it can only shrink in thickness.

The tendency toward dimensional reduction is compensated for by a tension set up in the elastic and flexible rubber that accumulates at a rate proportional to the speed of drying and to the thickness of the film. This tension produces contraction in the rubber mold causing it to draw away from the surface of the bone over depressions and to contract in every direction when removed from the enclosed object. Such a mold, before being removed, might be said to be "under tension," similar to that of a piece of rubber stretched between the fingers which, when released, contracts until the tension set up by the stretching is lost. Since rubber is not perfectly elastic it will not retain tension indefinitely, but tends to gradually readjust its form to fit the condition into which it is forced. Thus a piece of rubber that is stretched will not regain its *exact* original form but will be slightly longer and thinner than it was before application of the force.

It was therefore thought that drying the molds very slowly would facilitate the loss of tension and reduce any tendencies toward contraction. Such an experiment was performed by placing fresh molds in a container in which ventilation could be controlled and the loss of water retarded so that they required about a month to dry. Molds dried in this manner did not pull away over depressions and did not shrink more than one per cent. This result was a decided improvement but still was not the perfection we were aiming at. During these experiments vulcanized latex was used as the molding material.

Since vulcanization makes rubber more perfectly elastic and consequently less susceptible to alteration of form, it occurred to us that unvulcanized latex might be more suitable for the purpose. It should readjust more quickly and completely to the conditions

*Seventh: Comparing cast and original.*
*Eighth: A series of casts of fossils.*

imposed by the loss of water in drying. Experiments proved this to be the case. Little or no difficulty was experienced in making entirely accurate casts.

At about this time Mr. Ottmar F. von Fuehrer of the Carnegie Museum informed us of a latex molding compound manufactured by the American Anode, Inc. (Formula No. 10099a). This material was subjected to a series of tests and proved to be entirely satisfactory in molding. A simple technique for making molds of it was worked out and an account of the process is given below.

## Basic Procedures Involved

The basic procedures involved in making a rubber mold are quite simple. The liquid rubber is applied with a small brush, in successive applications, to build up a mold of sufficient thickness. The mold may be reinforced with pre-shrunk cheesecloth applied over a fresh coating of rubber and brushed down with the following one. The process is repeated as often as necessary in order to obtain a sufficiently rigid mold. When completed, the mold is dried and cured from one to two weeks, depending on its thickness, to allow sufficient time for any accumulated tension to be lost.

Some objects may require modification of the fundamental process described above. For convenience, molds that entirely enclose the specimen may be divided into two classes: The one-piece or continuous mold, made in a single unit and cut open, and the two-piece or sectional mold, made up of units which are constructed consecutively.

The one-piece mold is the easier to make and is usually employed in casting small or simple objects. It is prepared by applying the molding material over the entire model in a continuous film so that it completely encloses the model. The opening and closing of such a mold presents a major problem in its construction. Ordinarily, the opening is provided by cutting the mold (after it has cured) along a line that will be as inconspicuous as possible on the finished cast. The most feasible method of closing this type of mold for casting is accomplished by cementing the edges with rubber cement. Since the rubber mold is usually quite thin (one-eighth inch or less) there is but little contact surface, and the joint thus made will not withstand the pressure of a large quantity of plaster.

Furthermore, dried rubber cement accumulates on the edges of the mold (since it must be applied each time a cast is made) with the result that on considerable usage they become rough, do not fit closely, and cause undesirably conspicuous seams on the cast. This method is suitable for small molds intended to yield only a limited number of casts. On larger models, where other types of molds cannot be used, the continuous mold may be employed in conjunction with a device that will increase the contact area and thus strengthen the joint. This may be done as follows:

A strip of thin celluloid is attached to the model (set at a right angle to the surface) with celluloid cement so that it follows the line of the desired opening. The edges of the mold are built up to any required width on the face thus provided. Joints of this type have considerable strength even when cemented with a very thin solution of rubber cement. A thin rubber cement solution may be used to better advantage than a thick one since it accumulates more slowly on the contact faces of the mold.

In order that the entire surface of the model may be covered with rubber in a single operation, it is necessary to attach to it a rigid holder or "handle" that will enable the molder to hold or turn the model in any position desired without touching any part of the mold. The handle may be attached by plastering or cementing a rod strong enough for the purpose in a natural opening, or on a broken surface, or by drilling a hole in a restored area and inserting it there. Models that are too large to be treated in this manner, or that offer no opportunity to attach a "handle," are best enclosed in a two-piece mold.

Two-piece molds require more time and care in construction than continuous molds. For this reason they are generally not used in cases where only a few casts are expected to be made. They become necessary when, due to the nature of the model, a simpler sort of mold is unsuitable, or when a large number of casts is desired from a mold. It is unnecessary to provide the model with a handle since only one half of the mold is made at a time. The contact edges of the mold can readily be constructed with guides or keys to produce an accurate register. The molds may be removed from the model or casts with greater facility since no cutting is necessary. The two-piece mold is made in the following manner:

The specimen to be cast is given a coat of thin, white shellac (cut to 1 pound per gallon of alcohol) to harden and protect the surface, if necessary. The various openings, bridged over by bone, are blocked off with plasteline. Since the mold is to be made in two sections, the specimen is set up on a board and blocked with plasteline, as shown in one of the accompanying illustrations. A wall of this material about five-eighths of an inch wide is built up around the specimen. The flat upper surface of the wall is made to follow the median line of the specimen as closely as possible, dividing it longitudinally.

A plasteline dam, one-fourth of an inch thick and three-fourths of an inch wide, is then attached to the outer surface of the wall to form one side of a trough, the skull forming the other. Cone-shaped depressions are punched in the floor of the trough to act as guides in assembling the completed mold. A continuous V-shaped groove may also be added for the same purpose. All the plasteline surfaces intended to come in contact with the rubber are shellacked and allowed to dry.

## Applications of the Films

The initial film is applied with a small brush, care being taken to work the rubber into all depressions in order to eliminate bubbles and air pockets. The first application is followed immediately by a second one to insure complete covering of the surface. The thin film thus made is allowed to dry over night. Since a thin film of rubber dries quickly and contains only a small amount of water, it does not wet the bone appreciably, most of the water being given off into the air. When dry, this rubber film is fairly waterproof, serving to resist the tendency of the heavier following coat to drive its contained water inward as it dries and contracts.

Pre-shrunk cheesecloth is cut into strips two to three inches wide and about six inches in length. These are laid on over a fresh coating of rubber and brushed down so they adhere closely to the surface of the mold.

About four layers of cloth are successively applied, except in areas where some stretching of the rubber will be required to remove the mold. The cloth does not reduce the flexibility of the mold, but it does prevent stretching the rubber.

In areas where cloth is not applied, the rubber is built up to a somewhat greater thickness than on the parts of the mold containing cloth. The trough around the specimen is filled in with folds of cloth and rubber to a somewhat greater thickness. The mold is then allowed to dry for six days. At the end of this period the specimen is turned over and the "wall" of plasteline removed leaving the dam in place and exposing the edge of the first section of the mold. All the rubber surfaces, intended to come in contact with the new section, are shellacked (to act as a separator) and allowed to dry. The second half of the mold is then made in the same manner so that the entire specimen is covered with the molding material. A week or more is allowed thereafter for the completed mold to dry and "cure."

## Process of Making Hollow Casts

The process of making hollow casts is exactly suited to the characteristics of the rubber mold, and by making use of this process the casting may be done successfully without reinforcing the mold with any sort of rigid matrix. To obtain hollow casts of uniform thickness, the plaster is supplied to the mold in successive batches. In effect, the first application forms a thin shell (approximately one-sixteenth of an inch thick) inside the mold, all excess plaster being drained off. The second application clings to the freshly set plaster in the mold with greater facility, and forms a considerably thicker shell. If the process is repeated a third time, the shell attains a thickness of one-fourth inch or more and will be found sufficiently strong for all practical purposes.

The use of a rigid matrix is not required because the rubber is sufficiently strong to support the weight of the small quantity of plaster required for the initial coating without distorting the mold. On setting, it adds to the rigidity of the mold, and serves as a sort of internal matrix (care needs to be taken in handling the mold to prevent damage to the thin plaster coating during the process of pouring the second application). The plaster should be poured in small quantities, rotating the mold each time, thus distributing the weight of the fresh plaster over the mold. Allowing too much plaster to accumulate in the lowest portion of the mold is likely to crack the initial coating.

The hollow-mold technique provides a highly successful means of reducing the danger of imperfections caused by air traps in complicated molds. The act of turning or rotating the mold in every direction aids the plaster to flow into every part of the mold. In this connection it is advisable to use a rather "thin" mixture for the second coating in casts where the passages between relatively large areas are very constricted. Otherwise, the second coating may fail to reach some of them, since it loses its ability to "flow" rather quickly on contact with set plaster due to the latter quickly absorbing some of the water from the fresh mixture.

Molds too large to manipulate in distributing the plaster in the casting process require a special technique. The mold is made in two sections, each section being reinforced by a matrix constructed so that it supports as much of the mold as possible. In casting, each half of the mold is coated with an even thickness of plaster which may be either poured, or brushed on. Care should be taken not to apply more plaster than the mold will bear in areas that are not reinforced.

After the initial coating has set, it is reinforced with plaster and tow, or other fiber, so that the two sections will be light enough to handle, and strong enough to be durable. The edges of the sections of the cast should correspond very closely with the edges of the molds. After the plaster has hardened, the molds are removed, and the two sections of the cast fitted together and cemented with plaster. If the work is carefully done the joints will fit closely and be hardly noticeable. At any rate, the advantage of having a light cast in such a case outweighs the disadvantage of possible slight mutilation along the joints.

Minute fossils, such as jaws and maxillaries of very small animals, present a special set of obstacles to be overcome in casting. The major one arises from the difficulty encountered in filling the interstices of the mold with plaster. Use of the separating agents required by most molding compounds almost invariably obscures detail. Also, it may be difficult to apply the molding compound to the model in a satisfactory manner. The rubber technique surmounts these obstacles so well that it is actually easier to cast very small specimens than it is to cast larger ones. For convenience in handling a slender needle may be cemented to the model with celluloid cement. A thin solution of rubber is carefully brushed on to form the first coating. As soon as this coating has been applied, the surplus should be blown off as far as possible. This action will expose any uncovered areas or air bubbles. Such areas should be carefully filled and the entire model again coated. The mold is then built up to the required thickness and allowed to dry. After drying, the mold is cut open along the line of the needle, and far enough to permit easy removal of the model. In casting, the mold is turned inside out, thus exposing and opening the minute interstices which can then be readily coated with plaster. It is then returned to its normal form and the filling is completed. The excess plaster (if any) is drained off until the edges of the mold meet naturally. It may then be set aside until the plaster has hardened. Since no separating agent is used when casting with rubber, the surface detail of the model is so perfectly reproduced that the casts compare favorably with the model when examined under the microscope.

## Special Advantages of Latex

In conclusion, latex has proved to be so useful for molding purposes that it may safely be said no other material offers a comparable combination of advantages and of freedom from faults. These outstanding advantages of latex are simplicity of application, adaptability, superior durability of finished molds, excellent reproduction of minute detail, and slight risk of damage to the object being cast.

The procedure of making rubber molds may be carried out along with other tasks since the operations involved require but little time and attention to complete any one step. Furtherfore, mold-making may be continued or interrupted at any stage; it can be done at odd moments, and need not represent a time-consuming burden. By the use of the technique described above it should be possible for a relatively inexperienced person to produce accurate and attractive casts.

# The Commercial Production and Use of Neoprene

**BY ERNEST R. BRIDGWATER**

*Manager, Rubber Chemicals Division, E. I. du Pont de Nemours & Co., Inc.*

*Synthetic rubber has occupied the spotlight for the past few months. Concentration on this branch of the industry was recently heightened by the announcement of two new materials. What is the status of synthetic rubber? What is its commercial aspect at present? Where is its greatest use? These are some of the questions answered in the following statement made by Mr. Bridgwater before the Military Affairs Committee of the United States Senate at Washington, D. C., on June 14, 1940.—The Editor.*

SYNTHETIC rubber was the subject of intensive research, in Germany, England, and Russia, during the years 1908 to 1914. These investigations were inspired by the high price of natural rubber which then prevailed and presumably in part by the prospect of war. A considerable amount of work had been done on synthetic rubber before this time with no practical results, but it was not until these years that synthetic rubber investigations were liberally financed and aggressively pursued. The only result of the work done at that time was the production in Germany during the last war of 2,350 tons of an admittedly inferior product. Production was discontinued as soon as peace returned and, to the best of our knowledge, research was entirely discontinued throughout the world until 1925 when our company took up the problem.

## DuPont's Goal for Neoprene

The object of all previous work had apparently been to duplicate as closely as possible the properties of natural rubber. Our goal, on the other hand, was a quite different one. We recognized that we could not hope to synthesize rubber as cheaply as it could be grown in the Far East, but we also recognized that rubber was being pressed into service for many industrial uses for which it was not at all well adapted, merely because there was no better product available. Our objective was to create a synthetic product which would be outstandingly superior for some of these industrial uses and hence capable of finding a commercial market in free competition with natural rubber even though its price were much higher.

Our laboratory investigations which extended through the years 1925 to 1931 had to do principally with the production of rubber-like compounds from butadiene and related compounds. During the course of this work we discovered the previously unknown chemical compound, beta chlorobutadiene, and discovered also the process of polymerization by which we convert that chemical to neoprene. Incidentally, neoprene is not synthetic rubber in the strict sense of the term. When we speak of synthetic indigo or synthetic camphor, we mean a factory-made product that is chemically identical with natural indigo or natural camphor, which are agricultural products. No one has ever made a synthetic product that is identical with natural rubber. The term synthetic rubber has come to be used in a loose sense to mean any product whose properties even remotely resemble those of natural rubber.

Our first plant for the commercial production of neoprene was constructed in 1931. Commercial production began in 1932 and our sales in each year since then have been more than double the sales of the preceding year with the exception of 1938 when the increase over the preceding year was smaller. However, in 1939 our sales were again more than double the sales

*Coagulated neoprene being dumped from polymerization kettles at the Deepwater plant.*

*Some of the equipment used in the manufacture of neoprene at DuPont's plant in Deepwater, N. J. On the left is part of the refrigerating machinery; on the right are polymerization kettles.*

for 1938 and at the present time we are shipping about 550,000 pounds a month of neoprene, which represents an increase of fully 100% over the past twelve months.

The steady increase in the consumption of neoprene is due in part to the fact that we have steadily reduced our selling price from $1.05 a pound to the present price of 65c. A more important factor in the growth of the use of neoprene is the continuous progress that American rubber manufacturers have made in developing the art of using neoprene so as to make from it the best possible products. It must be remembered that neoprene, being quite different from natural rubber, requires different formulations for its most effective use. The art of formulating or, as the trade says, compounding natural rubber has been developed over a period of many years to such a point that rubber manufacturers today are making products that are many times more serviceable than those of 20 or 30 years ago. This improvement in rubber products is perhaps best known to the public in terms of improvement in tire mileage, but equal advances have been made in the art of compounding rubber for other purposes.

## Compounding Art Still Young

It is important to bear in mind that the remarkable improvement that has been made in the quality of all rubber products has been accomplished without any improvement whatever in rubber itself. The art of compounding neoprene is still very young and, although remarkable advances have been made in the past nine years, we anticipate that the rubber industry will make equally important advances in the future; hence, the quality of neoprene products has been and will continue to be improved independent of any improvement that may be made in neoprene itself as a result of our further researches.

We are selling neoprene at the present time to about 250 American rubber manufacturers who are making from it practically all types of products that were previously made solely from natural rubber. Because of its higher price, neoprene is used only when conditions of service are such that natural rubber is relatively short-lived. The fact that neoprene is almost completely immune to sunlight deterioration accounts for many of its uses, such for example as sealing strips around the windows on high-altitude airplanes. Other properties of neoprene that account for many of its commercial uses are its superior heat resistance and oil resistance as compared with natural rubber and the fact that it does not support combustion. It can be burned when a direct flame is applied to it, but the fire goes out as soon as the flame is removed. Neoprene is also more resistant to oxidation than natural rubber. It does not become either soft and sticky or hard and brittle due to the action of the oxygen of the air.

## Some Special Uses of Neoprene

Because of these unusual properties neoprene parts are used in the automobile, airplane, shipbuilding, machine tool, electrical and petroleum industries. Neoprene is also used for garments, shoes, gloves, hospital equipment, etc. There is hardly an industry that does not depend upon neoprene to do a job that cannot be done with natural rubber.

Neoprene is used commercially in solid tires for industrial trucks and experimentally in pneumatic tires for highway service. It is not used commercially for that purpose because its cost is still too high. Commercial use in pneumatic tires is expected to develop as the price of neoprene is reduced by reason of increased production and consequent lower cost. Neoprene is preferable to natural rubber for the outer surface of a tire because of its resistance to sunlight deterioration. This is a factor of particular importance in tractor tires and other types of tires not protected by fenders. Despite the industry's present limited experience in the production of tires from neoprene, it is possible to produce tire tread compositions having abrasion resistance approximately equal to that of the best natural rubber tire treads. It is expected that as the industry gains more experience it will be possible to improve this performance by a wide margin.

Little or no effort has been made to use neoprene as

a substitute for the rubber compositions that bind together the layers of cord in a pneumatic tire. Neoprene has no properties that would tend to make it superior to natural rubber for this purpose and if the rubber industry were called upon promptly to substitute neoprene for natural rubber at this point, it is likely that for a few years at least the quality of the tires would be poorer. The difference might be unnoticeable in passenger car tires, but large truck tires built for carrying heavy loads at high speeds present a more difficult problem.

The tire industry has spent 40 years learning how to build good tires from natural rubber. Much of this experience can be utilized in the development of neoprene tires. However, years of experience with the actual commercial production of tires and their use under a wide variety of service conditions will be required before the industry can learn how to make the best tire that can be produced from neoprene or any other new material.

Our experience with the large-scale production of neoprene places us in a position to expand our production very rapidly if it should be necessary to do so. How rapidly it could be expanded depends upon the extent to which it would be deemed advisable to give construction of neoprene plants priority over other elements of our rearmament program. The manufacture of any chemical product requires complicated mechanical equipment of a highly specialized nature. Large tonnages of steel, aluminum and corrosion resisting alloys would be required and a great deal of labor on the part of machinists and other skilled mechanics would also be necessary. Therefore, would it not seem unwise immediately to build synthetic rubber plants capable of supplying any substantial portion of our country's requirements if it is possible, by any means, to build up our reserve stocks of natural rubber to a figure that would take care of our requirements on a restricted war-time basis for a period of a year or so?

The immediate construction of huge synthetic rubber plants, which would not be self-supporting so long as natural rubber was available, seems unwise, not only because it would divert a substantial portion of the production of our metal-working industries from other defense activities of primary importance but also because the synthetic rubber industry is still in the early stages of its development. Even after nine years of experience in the commercial production we still build neoprene plants with the expectation, and even the hope, that they will become obsolete within five or ten years.

At the beginning of our commercial development obsolescence was even more rapid. We had so much to learn and were learning so fast that plants were out-of-date within a year after their completion. I fear that the construction of huge shadow plants would cause a cessation of new construction in the synthetic rubber industry for many years thereafter and, consequently, would retard the improvement of product, simplification of process, and lowering of production cost which are now proceeding at a rapid rate. It is not unlikely that the immediate construction of synthetic rubber plants which would not be self-supporting might result in our being less well prepared to meet a rubber emergency in 1945.

However, if it should become necessary to provide synthetic rubber as a substitute for the natural product with the utmost speed, we have in neoprene a product that the entire rubber industry has learned to use through eight years of actual commercial experience. Neoprene is being currently used in substantial tonnage in all important American plants that produce a general line of rubber products and in most of the specialty plants that produce a limited range of articles. Assuming, as we hope will be the case, that adequate supplies of crude rubber will continue to be available these manufacturers will in all probability again double their usage of neoprene within the next year and their consumption will continue to increase for some years to come, aided, of course, by the much lower prices we expect to be able to offer.

In view of the rapid growth of the demand for neoprene, we have found it necessary to make substantial expenditures for additional production facilities in each of the last five years. We are spending this year over two million dollars for that purpose and within a few months will have a production capacity of one million pounds a month. We expect to continue to add to our production capacity at such a rate as to keep us always a little ahead of the commercial demand for neoprene. Granted the blessing of peace, we are forecasting that consumption of neoprene a year hence will be about double the present rate and two years hence about four times greater.

## An Asbestos-Substitute Brake Lining

A NEW type of brake lining for automotive vehicles, intended to obviate the use of asbestos in the manufacture of that product, has been developed in Germany. According to the American Consul at Frankfort-on-Main, the new lining consists of aluminum or steel wool as a substitute for asbestos, incorporated with Buna as the binding material. This lining is reported to be not only equal to ordinary brake linings made from asbestos, rubber, resin, drying oils, etc., but to be superior in many ways.

To make the new type lining, fine metal fibers of approximately 0.03 mm. diameter are embedded in the synthetic rubber. In contrast to pure metal lining, the new fiber lining does not injure, by an abrasive effect, the metal surface to which it is applied. The metal fiber lining is mechanically resistant and is no more sensitive to oils and fats in reducing its braking power than are asbestos linings. Water is said to exert only an inconsequential reduction of braking action. Because of its high conductivity, the new lining dissipates excessive heat.

Three types of the newly-developed brake lining are being made, one containing aluminum wool incorporated in a high temperature-resistant synthetic rubber, the second likewise containing aluminum wool but incorporated in a mixture of resins and carbohydrates, and the third containing wool made of a soft special steel incorporated in a synthetic rubber binder. These linings may also be used for the braking of railway vehicles, with modifications.

*Three miles of hand-formed rubber cove base effects a dirt-proof connection between rubber tile floors and steel paneled walls in the new Bankers Life Building.*

# 115,000 Square Feet of Rubber Flooring

RUBBER tile flooring with a specially designed hand-formed cove and rubber wainscoting are used extensively in the new Bankers Life Building, Des Moines, Iowa. This building has been acclaimed as the "Building of the Decade" in deference to the many innovations in office building construction and planning which are incorporated in it.

Low cost maintenance with a high degree of serviceability was the determining factor in the specification of rubber floor and wall covering. The architects, Tinsley, McBroom and Higgins, Des Moines, earnestly sought design and materials that would insure minimum maintenance. Where necessary they broke with tradition to reach their objective.

For instance, in order to get the flexibility necessary for most effective department and office arrangement, they created a "pillar-less" structural steel framework. Consequently, each of four floors of the two million dollar seven-story building, has over 16,000 square feet of floor space without a single interrupting interior column, radiator, or permanent partition.

In these expansive clerical areas, the paneling of walls and partitions alike is of enameled steel. This material, used for the first time on so large a scale, is said to reduce the maintenance to as little as 20 per cent of traditional painted plaster walls. With this high standard of maintenance established for the wall areas, the architects sought a similar long-lived and easy-to-clean flooring. They gave proper weight to the prevention of accidents from slipping. Rubber tile, 115,000 square feet of it, was specified.

Over three miles of hand-formed rubber cove base

*The rubber tile floors in the employees' clubroom are special designs of blue and orange blocks on a gray background. Wainscot is in brilliant blue.*

*Auditorium for sales meetings and social functions has rubber wainscot in tan to match the upholstery of the seats. Designers and architects cooperated.*

with special molded corners and returns form the dust-proof transition between the floor and the steel paneled walls. The gray-green of the enameled walls, selected after attention to the requirements of a room in which a great deal of critical seeing is done, was matched with a special color in the rubber tile flooring.

Rubber wainscot was applied to stairwells and other service areas as well as to the walls of the gymnasium and auditorium. The architects' special color requirements were met again with a harmonious green for the stairwells and gymnasium and a special tan to match the leather of the seats in the auditorium. In the entire building 21,000 feet of the 1/16-inch rubber wainscot was applied.

The versatility of rubber materials is demonstrated in the employees' clubroom. Like the gymnasium mentioned above, the clubrooms are part of the recreational facilities provided by Bankers Life to help employees relax from the monotony of their clerical work. In these rooms, the architects wanted a lively contrast to the work areas, but without sacrificing the low maintenance and general practicality characteristic of the whole building.

The design called for brilliant orange and blue in walls and floors as well as furnishings. In cooperation with the supplier, American Tile and Rubber Company, the interior the architect visualized was made a very beautiful and serviceable reality. Special designs and colors were created. Large blue and orange squares set on a gray ground gave the floor the effect the architects sought. The blue is repeated in the rubber wainscot.

From the practical flooring and cove work in the tremendous work areas to the decorative gaiety of the clubroom, the result of close cooperation between the architect, flooring contractor and the manufacturer is evident. What the architect visualized the flooring man and manufacturer helped him realize, and the result is a revelation to many an architect and contractor.

## "Thiokol" Type F

RECENTLY introduced by the Thiokol Corporation, Trenton, N. J., "Thiokol" Type F, which is similar to crude rubber in that it usually is compounded, processed, and vulcanized to obtain finished rubber-like products, has a number of special properties. Included among these properties are the following, taken from one of the company's technical bulletins:

(1) Thiokol Type F offers unusual resistance to solvents, being practically unaffected by motor gasolines, fuel oil, kerosene, lubricating oils and other petroleum hydrocarbons, such as propane and butane. Although benzol swells it, it remains firm and in a serviceable condition. (2) When in contact with solvents the extractable matter removed is negligible. (3) It can be compounded so that it will not discolor white solvents or change the shade of colored solvents. (4) It can be compounded to give practically any hardness obtained with natural rubber, except ebonite.

These are only some of the characteristics exhibited by the new material. Others include tensile strength up to 1,500 pounds per square inch, resiliency comparable to good rubber stocks, abrasion resistance equal to two-thirds to three-fourths that of a first grade rubber tire tread, exceptional ozone resistance, and low temperature flexibility.

## Silene—A New White Reinforcing Pigment

A NEW white pigment, called Silene, a precipitated calcium silicate, which is said to give greater reinforcing properties than any other white or light colored commercial material, is being offered for rubber compounding. The new material was developed by the Columbia Alkali Corporation and its sale to the rubber industry is being handled exclusively by the Standard Chemical Company of Akron, Ohio.

Silene has a specific gravity of 2.05, a bulk density of 15 pounds per cubic foot, and a particle size of .2 to .3 micron. According to its producers, to whom we are indebted for the following data, it is particularly effective in stocks which require stiffness. A large amount may be incorporated in the batch without any processing difficulty and, unlike some reinforcing pigments, it mixes into the batch quickly.

The new material gives a high modulus, high tear resistance, extremely low permanent set, oil resistance, and resistance to abrasion and flex cracking to the finished product. Where laminated products are necessary there is no separation of the laminations. Any type acceleration may be used. There is no retardation of cure, but instead a slight acceleration is noticeable. Silene does not absorb the accelerator as do some of the other types of reinforcing pigments.

Silene is compatible with all known fillers. The proper combination of the new white reinforcing pigment with materials such as clay, whiting, magnesium carbonate, etc., may be easily worked out to obtain the desired results. It gives the same properties to synthetic rubbers as it does to the natural product. The following compounds give an indication of the results to be obtained with Silene:

| | Compound A | Compound B |
|---|---|---|
| Smoked Sheets | 100 | 100 |
| Silene | 150 | — |
| Magnesium Carbonate | — | 150 |
| Zinc Oxide | 10 | 10 |
| Stearic Acid | 3 | 3 |
| Sulfur | 3 | 3 |
| Captax | 1 | 1 |

Compound A

| *Cure* | *200% Modulus* | *Tensile* | *Elongation* | *Set* | *Hardness* |
|---|---|---|---|---|---|
| 10′ @ 40 lbs. | 1250 | 1600 | 290 | 22 | 90 |
| 20′ @ 40 lbs. | 1260 | 1480 | 255 | 22 | 92 |
| 30′ @ 40 lbs. | 1180 | 1490 | 283 | 26 | 95 |
| 45′ @ 40 lbs. | 1030 | 1390 | 320 | 30 | 95 |
| 60′ @ 40 lbs. | 980 | 1260 | 325 | 33 | 95 |
| 75′ @ 40 lbs. | 860 | 1130 | 327 | 38 | 95 |

Compound B

| | | | | | |
|---|---|---|---|---|---|
| 10′ @ 40 lbs. | no cure | | | | |
| 20′ @ 40 lbs. | no cure | | | | |
| 30′ @ 40 lbs. | no cure | | | | |
| 45′ @ 40 lbs. | 1020 | 1570 | 355 | 72 | 80 |
| 60′ @ 40 lbs. | 1010 | 1250 | 293 | 58 | 80 |
| 75′ @ 40 lbs. | 1020 | 1630 | 385 | 69 | 80 |

| | Compound A | Compound B |
|---|---|---|
| Specific Gravity | 1.422 | 1.456 |
| Minutes to Incorporate Pigment | 15 | 21 |
| Total Batch Time | 30 min. | 40 min. |

Silene is especially recommended by its producers for heels and soles, refrigerator gaskets, tiling, tubing, drug sundries, automotive products, plumbers' supplies, all-rubber garden hose, tires and tubes, and footwear.

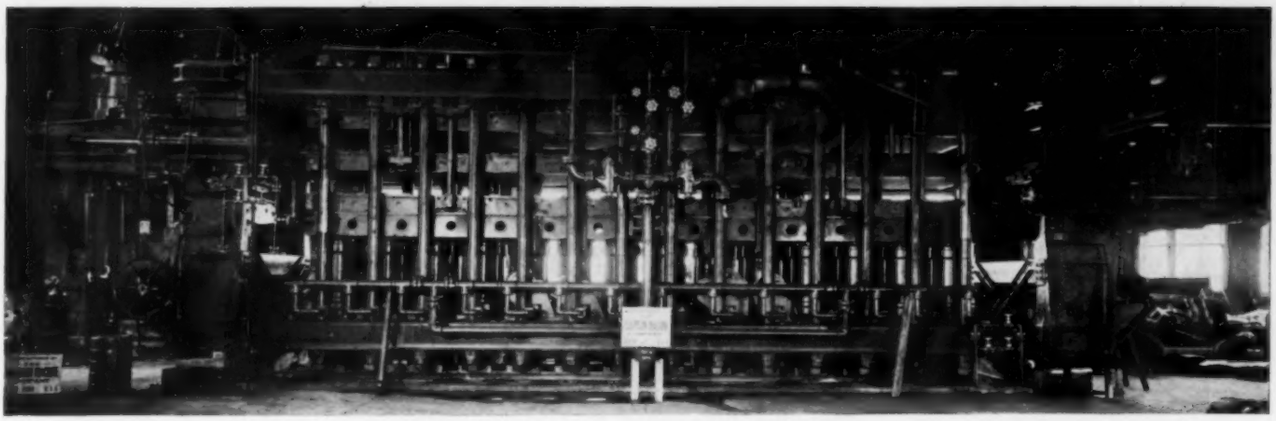

*FIG. 1—One of the largest belt presses of its kind with many parts built of Meehanite.*

# Meehanite's Role in the Manufacture of Rubber Machinery

**BY F. L. DAWES**

*Vice-President & General Manager,*
*Adamson Machine Company*

IN the production of a variety of rubber machinery, plastic presses, and hydraulic presses of varying requirements, one of the basic problems confronting the designer of this equipment is to translate improved design ideas into reality. In these cases metal is the raw material on which success depends and the designer's first search is for metals and alloys which will regularly give the new properties demanded by his improved design and also provide an assurance of dependability.

Our company, during the past several years, has been particularly active in testing and experimenting with various steels and cast irons and has been favorably impressed with the regular success which has been obtained with Meehanite. The wide variety of parts demanding different service qualities which are required by our line of products suggests that our experience in solving the problems created by modern design and demands may be helpful to others. Any modern piece of industrial equipment today must, in order to deserve the classification "modern," operate under production conditions which have become increasingly severe.

The problems so created generally affect such fundamentals as design of the equipment and the materials used in construction. Experiences reveal that often basic designs need not be altered appreciably if advantage is taken of the many superior properties now available in castings poured from the new and modern cast irons such as Meehanite. Increased tensile strengths (over 50,000 lbs. per sq. in.); good transverse strength with safe deflections; exceptionally high compression strength (175,000 lbs. per sq. in.); plus good corrosion resistance and an unusual uniformity of surface hardness are important requirements for castings used in our work.

For example, in Figure 1, which shows the largest belt press of its kind, recently built in our shops, such parts as steam platens, cylinders, rams, packing glands, top and bottom heads, and bases require such special characteristics. These parts were cast in Meehanite, the rams being heat-treated to a brinell hardness of 425 and then ground to a mirror finish. During the operation the 28 cylinders are required to taken an operating hydraulic pressure of 1500 lbs. per sq. in. On a machine of this sort, the platens themselves (Fig. 2) were 63 inches wide and 31 feet long. They were cast to achieve a close, dense iron which would polish without flaws to a very high finish, and withstand internal steam pressure without leakage.

In other words, this machine presented a perfect example of the tendency for greater size, production capacity, and efficiency required by machinery buyers. It demanded that good design not be let down by inferior materials.

A 60-inch twin rubber mill unit presents a somewhat

*FIG. 2—A 22-ton Meehanite platen, a single casting 63 inches wide and 31 feet long.*

*FIG. 3—For surface and dimensional accuracy and smooth finish all rams are ground.*

similar example. Here again increased operating speeds and capacities demanded that this equipment be built to eliminate noise; provide increased resistance to wear; and contribute in general a prolonged, trouble-free service life. These machines are now built with Meehanite housings, housing caps, water-cooled bearings, and connecting and bull gears. Steel pinions are used with these gears, and this combination has proved very effective in reducing noise and wear.

In our line of hydraulic presses, rams play an important part since upon the performance of these rams the quality and performance of a unit may frequently depend. Design, size, and weight of these rams is definitely restricted and must conform to the limits set forth by the particular piece of equipment. To these parts (Fig. 3) high strength Meehanite, heat-treated to the required hardness and then ground, has contributed a high safety factor, and a smooth, mirror-like surface which is surprisingly resistant to corrosion. Ram strengths have been increased without the necessity of increasing section thickness and weight, and the nature of the heat-treated metal has provided an important uniformity in the surface hardness.

## Complete Freedom from Warpage

A comparatively new machine (Fig. 4), a 615-ton double-opening automatic molding press, takes advantage of these and other factors. The feature of the press is the automatic control of the complete curing cycle. The molds are made easily available by the runways which bring them out and open them before the operators, and the press is provided with a double opening, allowing loading and unloading from both sides. An automatic knockout plate ejects the finished product. Freedom from warpage and a maintained dimensional accuracy as well as a stubborn resistance to wear are required for these parts, many of which are cast in Meehanite.

Summarizing from the design standpoint, it may be seen that we have secured by the use of a modern, high-strength cast iron five distinct advantages: (1) Improved type of resistance—by virtue of dense, uniform metal structure and heat treatment to specified hardnesses; (2) Better resistance to corrosion; (3) Freedom from fear of warpage and resultant damage; (4) Ability to step up speeds and capacities without increasing overall weight or altering fundamental good design; and (5) Castings which do not leak under hydraulic or steam pressure.

These benefits are quickly and regularly available today to all builders of machinery and equipment. Much is to be gained from the dependable engineering knowledge which the manufacturers of modern materials have uncovered and compiled to solve problems along these lines.

*FIG. 4—A 615-ton double-opening automatic molding press featuring automatic control of the curing cycle and complete availability of the mold plates.*

# Use of Reclaimed Rubber in Mechanical and Hard Rubber Goods

BY HENRY F. PALMER

*Chief Chemist,*
*Xylos Rubber Co.*

*The following is one of the papers which were given at the Symposium on Reclaimed Rubber presented before the Chicago Rubber Group on June 7, 1940. The paper on "Use of Reclaimed Rubber in Sponge Rubber Goods," by John S. Plumb, Factory Manager, U. S. Rubber Reclaiming Company, appeared in the previous issue.—The Editor.*

THE question of an adequate supply of crude rubber to fill the needs of this country emphasizes more than ever the importance of reclaimed rubber as a source of rubber hydrocarbon. Before being specific about the use of reclaimed rubber in various mechanical and hard rubber goods, it seems desirable to point out four very definite reasons why reclaimed rubber finds such a wide and growing use. These are as follows: (1) Economy; (2) Ease of processing; (3) Uniformity; and (4) Faster rate of cure. Each of these points will be described briefly.

## Economy

That reclaimed rubber has a definite economy in itself has been demonstrated by making a "synthetic" reclaim from crude rubber and fillers (Formula 1) which was found to have very nearly the same properties as a whole tire reclaim against which it was tested *(1)*.

FORMULA 1

| | |
|---|---|
| Smoked Sheets | 100. |
| Mineral Rubber | 50. |
| Gilders Whiting | 41. |
| Zinc Oxide | 5. |
| Heptene | 0.6 |
| | 196.6 |
| Specific Gravity | 1.13 |

This "synthetic" reclaim was compared with a whole tire reclaim in two carcass compounds containing approximately 40 and 65 per cent of reclaim and in a tread compound containing 13 per cent of reclaim with comparable test results for the two materials. Since the other ingredients in Formula 1 are fairly constant in price, one can arrive at the curve shown in Figure 1. The current price of crude rubber is approximately $.22 per pound, hence it is seen that whole tire reclaim should be roughly one-half of this, or $.11 per pound, if it is priced at its full compounding value. The present price of whole tire reclaim is only $.0600 per pound

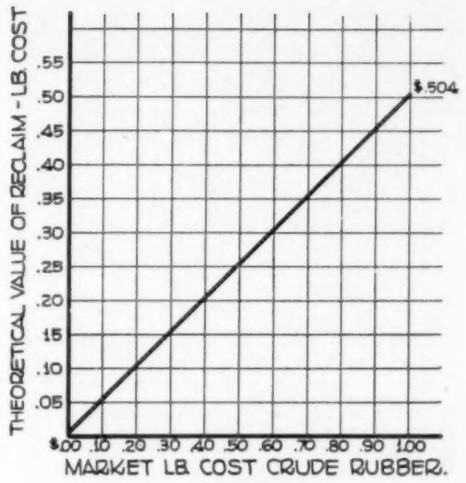


*FIG. 1.*

or approximately 45 per cent less than the value indicated.

## Ease of Processing

The power consumption for masticating reclaimed rubber has been found to be only 60 to 65 per cent of that required for masticating smoked sheets. Since the time of mixing with reclaimed rubber is definitely less than with crude rubber, the turnover per unit mill or mixer is greater for reclaimed rubber compounds. Furthermore, for open mill mixing, reclaimed rubber gives a sheet which covers the rolls of the mill quickly and more extensively before the addition of pigment. The fact that most reclaimed rubber is more inert than crude rubber is also of much benefit in tubing and calendering operations.

## Uniformity

Reclaimed rubber may be described as "tailor-made," "man-made," or "manufactured" rubber. It is subect to production control methods in its manufacture and is a decidedly uniform product compared to crude rubber. The existence of the Crude Rubber Committee of the Rubber Division of the American Chemical Society which for some time has been attempting to establish proper testing procedures for crude rubber is evidence in itself of the marked

(1) Private Communication: U. S. Rubber Co., New York, N. Y.

TABLE I—TWO TYPES OF COMPOUNDS IN WHICH RECLAIMED RUBBER HAS BEEN INTRODUCED

| SPECIAL TUBING | A | B |
|---|---|---|
| Smoked Sheets | 47.80 | 39.20 |
| Black Blend Reclaim | ..... | 20.00 |
| Factice | 12.00 | 6.00 |
| Zinc Oxide | 2.00 | 2.00 |
| Carbon Black | 16.00 | 16.00 |
| Clay | 17.85 | 12.50 |
| Stearic Acid | 1.00 | 1.00 |
| Paraffin | 1.00 | 1.00 |
| 2-4 Diamino-diphenylamine | .05 | .05 |
| Phenyl-b-naphthylamine | .50 | .50 |
| Sulfur | 1.40 | 1.40 |
| Mercaptobenzothiazole | .40 | .35 |
| | 100.00 | 100.00 |
| Specific Gravity | 1.185 | 1.225 |
| Rubber Content | 47.80 | 47.60 |
| Sulfur/Rubber | 2.92 | 2.94 |
| Accelerator/Rubber | .84 | .74 |
| Material Cost | .121 | .108 |
| Volume Cost | .143 | .132 |
| *15′ Cure at 290° F.* | | |
| Stress @ 300% | 590 | 830 |
| Elongation | 665 | 575 |
| Tensile | 2205 | 2640 |
| Shore Hardness | 49 | 55 |
| *20′ Cure at 290° F.* | | |
| Stress @ 300% | 610 | 920 |
| Elongation | 655 | 575 |
| Tensile | 2285 | 2760 |
| Shore Hardness | 50 | 60 |

| INDUSTRIAL TIRE | A | B |
|---|---|---|
| Smoked Sheets | 45.60 | 32.00 |
| Whole Tire Reclaim | ..... | 30.00 |
| Zinc Oxide | 9.10 | 15.00 |
| Sulfur | 1.15 | 1.70 |
| Semi-reinforcing Black | 34.70 | 16.55 |
| Clay | 4.60 | ..... |
| Stearic Acid | .90 | .50 |
| Medium Process Oil | 1.80 | 2.00 |
| Pine Tar Oil | 1.80 | 2.00 |
| Butyraldehyde Aniline Condensation Product | .35 | .25 |
| | 100.00 | 100.00 |
| Specific Gravity | 1.28 | 1.27 |
| Rubber Content | 45.60 | 49.10 |
| Sulfur/Rubber | 2.52 | 3.46 |
| Accelerator/Rubber | .77 | .51 |
| Material Cost | .115 | .101 |
| Volume Cost | .147 | .128 |
| *15′ Cure at 298° F.* | | |
| Stress @ 300% | 1555 | 890 |
| Elongation | 455 | 535 |
| Tensile | 2220 | 2250 |
| Shore Hardness | 69 | 60 |
| *30′ Cure at 298° F.* | | |
| Stress @ 300% | 1910 | 1100 |
| Elongation | 370 | 485 |
| Tensile | 2200 | 2140 |
| Shore Hardness | 73 | 64 |

variability of crude rubber. A reference to the literature will reveal many articles which describe this variability. Also, since reclaimed rubber may easily be made to specifications, it is often the stabilizer of a rubber compound.

## Faster Rate of Cure

The more rapid rate of cure of reclaimed rubber compared to crude rubber has been pointed out in two comprehensive papers *(2, 3)*. Reclaimed rubber, cured with sulfur, cures faster than crude rubber with sulfur, whether the latter is in the presence of zinc oxide or not. It has been shown that the presence of residual alkali has a very decided effect on the rate of cure, although even neutral types of reclaimed rubber cure faster than crude rubber. The remarkably fast rate of cure of reclaimed rubber persists to a very great extent when it is introduced as a compounding ingredient. The introduction of as little as 10 per cent of reclaimed rubber may allow the accelerator to be dropped as much as 40 per cent.

While there are many types of hard rubber products, the bulk of the products may be typified by battery cases, covers and vents, and steering wheels. In battery cases particularly, reclaimed rubber is generally used to the exclusion of crude rubber. Not so many years ago it was considered necessary to use a certain amount of crude rubber, but present day compounding has eliminated for the most part the use of crude rubber in this type of product.

(2) Kilbourne & Miller, *Ind. Eng. Chem.*, **22**, 69 (1930).
(3) Shepard, Palmer & Miller, *Ind. Eng. Chem.*, **20**, 143 (1928).

Sizable amounts of reclaimed rubber are used in automobile steering wheels where the reclaim compound benefits shrinkage and is much less brittle when cold than a 100 per cent crude compound loaded with fillers to the same volume cost. Other hard rubber products where reclaimed rubber is being used in reasonable percentages are caster wheels, matrix molds, refrigerator lids, toilet seats, and hard rubber bases. Certain grades of hard rubber, such as combs and pipe stems, are not made with a very extensive use of reclaimed rubber except of the pure gum type.

In general, it may be said that hard rubber products show a very high utilization of reclaimed rubber whereas in mechanical goods there are many items where reclaimed rubber has not been used to its fullest advantage as regards quality and cost. Excepting the tires, probably the largest rubber parts in an automobile which are made from rubber are the mats and running boards. These two products contain reasonably high percentages of reclaimed rubber, but there are a great many other parts in an automobile in which higher percentages of reclaimed rubber undoubtedly can and will be used as time goes on.

There are several reasons why higher percentages of reclaimed rubber are not used today in various types of mechanical goods and one of these is the use of improper specifications by the consumer of the product. Improper specifications seem to be a considerable handicap to the rubber industry. By improper specifications are meant those which base the criterion of quality on chemical and physical tests which have no relationship to the actual performance of the product. Recently a tabulation of 120 government specifications

showed that half of them in some way precluded the use of reclaimed rubber in any quantity. This condition will be changed in the future as there is no question that the government at the present time is becoming increasingly conscious of the reclaimed rubber industry.

However, the condition also exists in many of the specifications of the other consumers and this must be overcome by proper education of the men responsible for the writing of the specifications. There are very many types of compounds in which reclaimed rubber can be used without lowering the quality below a standard which is satisfactory for the use to which the compound is put, and, where this is so, it would seem that reclaimed rubber should be utilized to the fullest extent. This is not the case at the present time as much of the work of the reclaimer is the introduction of some and more of reclaimed rubber into many compounds.

For an example of two types of compounds in which reclaim has been introduced reference should be made to Table I. Special tubing compound B has had 20 per cent of black blend reclaim introduced and the physical properties show a definite increase in tensile strength, the compound has been stiffened, the elongation lowered, and the hardness increased. There is a savings of approximately 8 per cent in volume cost effected by the change. In the industrial tire, formula B, with 30 per cent of whole tire reclaim, has given an equivalent tensile strength, a higher elongation, and a softer compound than the crude rubber compound, with a savings of approximately 13 per cent in volume cost. These two recipes are given as examples of what can be done in introducing reclaimed rubber.

Recently our laboratory increased the amount of reclaimed rubber from 15 to 35 per cent in a very smooth extruded type of compound giving a very excellent smoothness and quality sufficient to meet an automotive specification. Such cases as these occur frequently where reclaim can be introduced in very appreciable quantities, still allowing the proper quality in the compound.

It seems desirable to discuss the problem of the choice of reclaimed rubber by the compounder. The most common reclaimed rubbers, of course, are based on whole tires, parts of whole tires, and on inner tubes. Inasmuch as the manufacturer can produce a great variety of combinations in reclaimed rubber, how is one to choose the proper reclaim for any given problem?

Naturally the reclaimer has in his regular line those reclaims for which there is a demand, and also those which he feels should be of interest to the trade. If a compounder is familiar with a certain number of reclaims, he is able from this experience to choose that one which he feels is likely to do his job. However, if he has a new problem or wishes to ascertain if it is possible to improve upon any given use of a reclaim, he should lay his problem in its entirety before the reclaimed rubber representative. The reclaimer is then able to submit to him material which should fill his need. This is the most successful way of choosing a reclaim or of developing a reclaim for a specific use.

In the use of reclaimed rubber in any given type of compound, there are two methods of attack:

(1) To build the compound around the reclaimed rubber.

(2) To build the reclaimed rubber to fit the compound.

For simplicity of operation in any plant and the elimination of an excess number of reclaims, procedure (1) should be used. A good compounder can take three or four standard reclaims in a mechanical goods plant and work out a very great variety of satisfactory compounds. Procedure (2) should be used only for very specific and unusual cases where the results desired cannot be obtained without changing the reclaimed rubber in question.

In the case of reclaimed rubber, there is a range in prices for different grades and naturally the price of the commodity is an important factor in its choice for a given use. Generally speaking, the prices of different reclaimed rubbers all relate to whole tires and inner tubes and the prices of inner tubes and whole tires relate to the price of crude rubber to a large extent. The reason for this is, of course, that many small dealers have no other way of judging the value of their scrap except that the price of crude rubber may be going up, and, therefore, they hold out for a higher price. Hence, in choosing a reclaimed rubber, it is often possible for a choice to be made of a material just as suitable for a given use but cheaper in price because of some certain conditions which allow it.

It cannot be said that prices are determined in relation to rubber hydrocarbon or specific gravity wholly —many other factors are involved. The fact that when in 1932 the price of crude rubber dropped to less than $.03 per pound whereas tire reclaim sold at $.035 and that reclaimed rubber maintained a 20 per cent ratio to crude rubber emphasizes the entrenched position this raw material has in certain outlets in the rubber industry.

There are a vast number of other potential uses for reclaimed rubber in the mechanical goods field and it is the job of the compounder and the reclaimer to work to mutual advantage in developing this use of reclaimed rubber.

# Importance of Reclaimed Rubber to the Domestic Rubber Industry


## BY GILBERT K. TRIMBLE

*Vice-President, Midwest Rubber Reclaiming Co.*


*(Talk given as an introduction to the moving picture, "It Might Happen Here," at the Symposium on Reclaimed Rubber held by the Chicago Rubber Group on June 7, 1940).*

THERE has been much speculation lately and much in the news and on the radio regarding the status quo of the Dutch East Indies and of the Malay States. This territory, where the rubber plantations of the world are situated, is a rich prize, the possession of which could give the ruling nation an economic strangle hold on much of the civilized world.

The recent exchange of statements between Secre-

tary of State Cordell Hull and the Japanese Government were certainly of vital significance to all of us in the rubber business. There can be no doubt about the meaning of these notes. The United States is alarmed about the future availability of crude rubber.

What will happen in Asia eventually, no one knows. Events in Europe have apparently brushed aside present considerations of these countries. Holland has capitulated, and Holland owned the Dutch East Indies. The British flag is still flying over the Malay Peninsula. Both districts are still producing and shipping rubber, and any shortage which exists at present is due entirely to lack of shipping facilities.

### America's Natural Resources

America has been blessed with a wealth of natural resources. It has great mineral wealth in its coal, iron, copper, and petroleum. Vast acreages are planted in food stuffs and other agricultural products, such as cotton. There are a few items in which we are somewhat deficient, such as tin and manganese, but rubber is the great hole in our economic armor. The United States' rubber crop is pitiful in volume—hardly a "drop in the bucket." Worse than this, less than 2% of the world's rubber shipments come from the whole western hemisphere. We are entirely dependent therefore on a territory on the other side of the globe for this vital material.

There has been a lot of discussion in our technical journals and in the newspapers concerning the production of synthetic rubber. At the Boston meeting of the American Chemical Society, there was much talk on this subject, and since then there has been more material, some of it bordering on the sensational, in our newspapers and journals.

Rubber-like polymerized products of American and German origin have been available in this country for some time. These materials, while not strictly synthetic rubber in the chemical sense, have been used as such successfully for a number of commercial products, and in some cases are superior to natural crude rubber. The synthetic industry, however, is still in its infancy. It will require years to adapt laboratory procedures to commercial processes, and it will take vast sums of money and many unsuccessful attempts at quantity production before finally it can be truthfully said that America is no longer dependent on the Far East for its rubber supply.

### Coming Period of Independence

America should go through this period, and it is believed that the next decade will witness a United States completely independent in this respect. It must be remembered, however, that this problem is a difficult one. As long as rubber does flow to our shores, at a low price, it will be used instead of substitutes. "Synthetic Rubber" now sells at four to six times the price of crude rubber. The price undoubtedly will be lowered, but crude can also be lowered, and at a twelve-cent level, for instance, synthetic would not be produced in large quantities. Thus it is entirely probable that no facilities for large volume production could be built up in this country, unless it were as a government subsidized project.

America fortunately does have a volume rubber crop, however. This is not crude rubber or synthetic rubber, but reclaimed rubber. For years this country's capacity for producing high grades of this material have increased, and in any immediate emergency the rubber goods manufacturers would turn to the rubber reclaiming industry for their raw material.

### Potential Capacity for Reclaim

For example, in 1938 there were produced in this country about 1,000 tons of synthetic rubber. In this same year, there were produced 121,000 tons of reclaimed rubber. This represented about 25% of all the rubber used. In 1939 the synthetic production probably doubled, but reclaim was produced to the extent of 162,000 tons. A national survey made in 1937 showed a potential capacity for producing reclaim of 265,000 tons annually.

The technical procedure for producing reclaimed rubber is well established, and there is an abundance of scrap. Thus the capacity for producing reclaimed rubber could be built up almost overnight, by simply adding on new units. Incidentally too much scrap has already been exported, and it would be quite logical to place an immediate embargo on all scrap rubber. The average American citizen does not understand the importance of reclaimed rubber. He is much more inclined to look upon this commodity as diluent or filler —a cheap substitute for crude rubber, and a material not at all comparable to crude.

### Reason for the Motion Picture

The Midwest Rubber Reclaiming Company has felt the need of dispelling this misunderstanding of an important American industry, and has caused to be produced a moving picture "It Might Happen Here." This picture deals with an America suddenly deprived of rubber and shows how the rubber reclaiming industry could carry the load in such a national emergency. This picture comes as a sequel to "Rubber Reborn" which was produced several years ago and which accurately depicted the rubber reclaiming process as it is carried on in this country today.

The men in the organizations of the various rubber reclaiming companies feel that America will not be let down in any emergency because "America does produce its own rubber."

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The Cleveland Tramrail Division of the Cleveland Crane & Engineering Co., Wickliffe, Ohio, has developed a new **tilting box grab and carrier** that picks boxes up, sets them down, or empties them by tilting, all operations being manipulated by means of controllers in the cab. Units of any size up to five tons capacity are available.

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Announcement of a new model of the **Explosimeter Combustible Gas Indicator,** which features true one-hand operation, has been made by the Mine Safety Appliances Co., Pittsburgh, Penna. Immediate response to combustible gas concentrations is provided by the instrument's easy-reading meter.

# Editorials . . . . . .

## Reserves of Rubber

EVER since Sir John Hay, one of the British representatives on the International Rubber Regulation Committee, arrived in the United States several weeks ago, the domestic rubber trade knew that something was brewing. In most circles, his appearance in this country was accepted as an indication that another barter deal was in the offing, one perhaps embracing the exchange of America's surplus farm foods for England's rubber. Few gave any consideration to the possibility of outright purchase for cash by the American Government.

Nevertheless, that was exactly what happened. Under the National Defense plan, the government, through the Rubber Reserve Company, a corporation set up under recently enacted statutes which do not require incorporation under State laws, has virtually contracted to accept 150,000 tons of rubber within the next six to twelve months, at a price between 18 and 20 cents a pound in New York, with all purchases to be made on the open market.

Two salient points stand out in the agreement made between the Rubber Reserve Company and the Regulation Committee, those concerned with the use of the rubber and the price to be paid. As in the case of the cotton-rubber barter deal, the rubber to be acquired is to be considered a reserve, to be used only in case of emergency. However, whereas the term "emergency" in connection with American reserve rubber stocks was formerly interpreted to mean only should the United States become involved in war, it is now defined to cover not only this meaning but also in the event shipments from rubber sources in the East are interrupted —for any reason whatsoever.

As for the prices provided in the new agreement, the United States Government must make its purchases in the open market. Should the price go above 20 cents a pound it is not obligated to buy, but if the price is between 18 and 20 cents then it is obligated to continue purchasing until it has acquired the full 150,000 tons called for. But how could this additional reserve stock be accumulated in a reasonable length of time if conditions are such that the price is maintained above 20 cents a pound? Sir John Hay's solution of this problem is, to say the least, interesting. Said Sir John, the Regulation Committee will see to it that the price is maintained near the desired levels. How? By releasing large enough quantities of rubber on the market to "break" the price.

## Export Licenses

WITH surprising rapidity, even for the New Deal Administration, the "embargo" on exports of certain strategic materials from the United States went into effect early this month. On July 2 President Roosevelt issued a proclamation listing the restrictions, naming the materials, and explaining a licensing system; on July 5 the system went into effect. It is not surprising, therefore, that exporters were virtually at a loss as to procedure when the "embargo" became effective, with customs officials no less in the dark.

Specifically, the Presidential proclamation states that certain materials, including rubber, reclaimed rubber and scrap rubber, cannot be exported in the future unless a special license for each individual shipment is secured from the State Department. Special forms must first be filled out and then submitted to Washington for approval. This of course means delay on all foreign shipments, not to mention additional clerical costs.

Although the institution of an export licensing system smacks of still further regulation, it should be considered from the standpoint of National Defense. Its main purpose is undoubtedly to prevent the shipment of military materials from the United States to nations which might eventually make use of them to our disadvantage. Considered from the patriotic viewpoint, the system is a good one. If Washington can keep politics out of its decisions on proposed shipments submitted to the State Department, then it will be calmly accepted by exporters in general.

# CURRENT NEWS OF THE MONTH

## GOVERNMENT MAKES PLANS TO ACQUIRE AN ADDITIONAL RESERVE OF 150,000 TONS OF CRUDE RUBBER FOR EMERGENCY PURPOSES

***The Rubber Reserve Company Is Organized by the Reconstruction Finance Corporation to Acquire Reserve Stocks with Loans To Be Advanced by It***

ACTION to secure an additional 150,000 long tons of crude rubber as a reserve to be used in case of emergency, over and above the 85,000 tons provided in the cotton-rubber barter deal arranged last year between the United States and England, has been taken by Washington. Acting promptly under powers afforded by the new Reconstruction Finance Bill signed by President Roosevelt on June 26, which authorizes the Reconstruction Finance Corporation to finance the purchase of strategical war materials, Jesse H. Jones, Loan Administrator, announced on July 1 that two government corporations have been formed, one to acquire rubber reserves and the other to procure strategic metals. The two corporations are known as the Rubber Reserve Company and the Metals Reserve Company.

The Rubber Reserve Company, formed under a recently enacted statute which does not require incorporation under State laws, will have a capital of $5,000,000. To keep the company functioning, half of this amount will be subscribed by the rubber manufacturing industry and the other half by the government. The full sum will be used for clerical purposes and for the storage and handling of the rubber.

### *Rubber to be Used as Collateral*

The full cost of the rubber, however, will be borne by the Reconstruction Finance Corporation on non-recourse loans with the rubber itself as collateral. According to Loan Administrator Jones, the R.F.C. has already authorized a loan of $65,000,000 to the Rubber Reserve Company to begin the acquisition of the reserve rubber. It has also been indicated that the R.F.C. might later sell securities publicly to raise funds for further advances.

According to Sir John Hay, representative of the International Rubber Regulation Committee, who has been in this country for the past several weeks conferring with both governmental and industrial authorities, and who was present at the conference at which Mr. Jones announced the plan for acquisition of additional rubber reserves and organization of the Rubber Reserve Company, the Regulation Committee has agreed to release 150,000 tons over a period of between six and twelve months for outright purchase by the American Government.

As Sir John explained, the amount provided for in the new agreement represents approximately 15% of the present annual output of crude rubber in the Near East. He pointed out, however, that although 1,000,000 tons has been the approximate amount shipped annually in the past few years, the producers have an assessed capacity of 1,600,000 tons, or more than half again as much as they normally produce.

On July 5, the International Rubber Regulation Committee raised the export quota for all signatory countries to 85% of basic quotas from the previously fixed 80% which had been announced for the balance of the year. There is little doubt in trade circles that raising of permissible exports was made to permit building the additional rubber reserve in the United States. Under the new quota, shipments will amount to approximately 110,000 tons per month.

The agreement for acquisition of the additional 150,000 tons of reserve rubber, made directly between the newly-organized Rubber Reserve Company and the International Rubber Regulation Committee, provides for a price of 18 to 20 cents a pound, with all purchases to be made in the open market. The rubber concern is obligated to purchase all rubber offered in the market between these prices until the full amount involved is acquired, but should the price go above 20 cents a pound then it is not required to make any purchases.

### *Market Price to be Controlled*

When the question was raised as to how long the American Government might have to wait before acquiring the reserve stocks in the event the price for rubber in the open market was maintained at more than 20 cents for a considerable length of time, Sir John Hay explained that by controlling the supply the Regulation Committee would see to it that the price in the market would be the one that the Government indicated it wanted. If necessary, he said, much greater supplies could always be released on the market to bring the price down to the required levels.

The point is being stressed that the rubber purchased under the new agreement calling for 150,000 tons of reserve stock will not increase the free supply of rubber in the United States. As in the case of the 85,000 tons provided for in the cotton-rubber barter deal, of which considerably less than half has been imported as yet, the reserve rubber will be stored for emergency purposes only. In the new agreement, however, an emergency is defined as not only a war in which the United States is involved but also as a major interruption of the flow of rubber from the East.

The arrangement naturally necessitates an understanding with domestic rubber manufacturers regarding the rotation of government-held rubber in order to avoid deterioration. No difficulties on this score are expected.

### *235,000 Ton Reserve Provided*

The 150,000 tons to be acquired by the Rubber Reserve Company, plus the 85,000 tons provided for in the cotton-rubber deal, will provide a total reserve supply in the United States of 235,000 tons. This is, of course, in addition to normal stocks held by the industry.

Since, based on recent figures, the rubber industry generally has available approximately 160,000 tons, and there are usually about 110,000 tons afloat (at least in recent months), once the 235,000 reserve stocks are accumulated the United States will have a backlog of rubber equal to a year's supply. Consumption of rubber in the United States amounted to 592,000 tons last year, an average consumption of 50,000 monthly.

At the time Loan Administrator Jones announced the formation of the rubber and metals reserve corporations, he also stated that Donald M. Nelson, executive vice-president of Sears, Roebuck & Company, who had been acting as director of the government's procurement division, had resigned from the latter position so that he could be free to coordinate all government defense purchases in connection with the activities of the National Defense Advisory Commission. C. E. Mack has been appointed in place of Mr. Nelson as director of the procurement division.

## NEW EXPORT LICENSE SYSTEM AFFECTS ALL RUBBER SHIPMENTS

Under the terms of the embargo on the exports from the United States of certain strategic war materials, which was proclaimed by President Roosevelt on July 2 and which went into effect on July 5, three short days thereafter, licenses must be secured from the State Department on every foreign shipment of such materials.

The materials covered include all forms and types of crude rubber, reclaimed rubber and scrap rubber containing in excess of 5% rubber. The proclamation does not cover shipments to insular possessions of the United States, including Puerto Rico and the Virgin Islands.

### *Considerable Confusion Evident*

Considerable confusion was evident shortly after July 5th when the terms of the proclamation went into effect. Orders were received by customs officials in New York giving the procedure they were to follow in permitting exports included on the President's embargo list and providing specifically not to allow them in the absence of approval from Washington. Each application for an export license covering the metals and other goods will have to be made directly by the shipper to the State Department.

Forwarders expressed favor for the establishing at New York of a branch of the Export Control Bureau similar to the organization which functioned during the World War at 45 Broadway. Such a step will make possible closer supervision and reduce delays in the granting of licenses, they asserted. The necessity of sending all applications to Washington for approval will be a serious handicap, it was added.

In the absence of full particulars there was a great deal of confusion as to the full effect of the embargo proclamation. If all manufactured goods in which appear the metals and chemicals named are not to be permitted for export, United States foreign trade will be seriously hampered.

Many of the pleas forwarded to Washington for information included inquiry as to the status of specific goods. Pending clarification of the situation, customs officials refused export declarations for all shipments consisting in any part of items listed in the Presidential proclamation.

### *Exporters in Agreement*

Although the short notice between the Presidential proclamation of July 2 and July 5, its effective date, left little time for preparation, exporters in general appeared to be in sympathy with the restrictions on exports of materials and products essential to this country's defense.

It was believed that there would be no difficulty in obtaining licenses for shipment of items on the list to Allied destinations and that the main purpose is to prevent the diverting of stocks in the United States for the possible benefit of nations which might make use of them to the disadvantage of the United States.

The full list of vital materials specified in the Presidential proclamation which now require export licenses follows: Aluminum, Antimony, Asbestos, Chromium, Flax, Graphite, Hides, Manganese, Magnesium, Mercury, Mica, Molybdenum, Platinum, Quartz Crystals, Quinine, Rubber, Silk, Tin, Toluol, Tungsten, Vanadium, and Wool. As in the case of rubber, explanations are made with regard to each material with respect to what forms may not be shipped without license.

## Coming Events

**July 19.** Boston Rubber Group, Annual Outing, Weston Golf Club, Weston Center, Mass.

**July 20.** Chicago Rubber Group, Annual Outing, Lincolnshire Country Club, Crete, Ill.

**Sept. 12-13.** Rubber Division, A.C.S., Annual Meeting, Book-Cadillac Hotel, Detroit, Mich.

**Oct. 7-11.** National Safety Congress, Stevens Hotel, Chicago, Ill.

**Jan. 6-10.** S.A.E. Annual Meeting, Book-Cadillac Hotel, Detroit, Mich.

**June 23-27.** A.S.T.M. Annual Meeting, Palmer House, Chicago, Ill.

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Ansbacher-Siegle Corp., Rosebank, Staten Island, N. Y., has opened its own Middle Western sales office at 820 South Clinton Street, Chicago. The new office will be under the supervision of H. M. Cotey, member of the company's sales staff. Sales in the middle western territory were formerly handled by American Aniline Products, Inc.

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Tire price schedules are being revised upward to compensate the manufacturers for the higher excise taxes which went into effect on July 1. The net result to the public will be very small, raising a $13.95 tire to $14.00 as an example. Reason for the increase in prices to dealers is to maintain the present position of the profit margin.

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The Naugatuck Chemical Factory Golf Team met the New York Office Team on June 27 in the first of a series of annual golf matches to be played for the General Manager's Trophy. The factory team won custody of the trophy for the first year, defeating the office team by a score of 38½ to 12½. Arthur Nolan, of the office team, had low gross with a score of 84.

## FOUR-POINT SUPPLY PROGRAM OUTLINED BY P. W. LITCHFIELD

A four-point program to assure the United States of adequate supplies of crude rubber under all conditions was outlined on July 15 in Akron by P. W. Litchfield, president of the Goodyear Tire & Rubber Company. In a detailed statement Mr. Litchfield urged:

(1) That government take steps to immediately provide a nationalized emergency reserve of crude rubber up to 400,000 tons in excess of current commercial needs;

(2) That government take the lead in a program of conservation including the collection of larger supplies of scrap rubber for reclaim and the placing of an embargo on exports of crude rubber or scrap;

(3) That encouragement be afforded moderate expansion of our facilities for the production of synthetic rubbers; and

(4) That the government appropriate for and encourage the development of rubber plantations in tropical Central and South America.

### *Rubber is a Basic Essential*

The Litchfield statement pointed out that rubber is a basic essential in all forms of transportation and communication and that we obtain ninety-six per cent of our national requirements from half-way around the world. He pointed out that with all of the major nations of the world, save the United States, at war the established means of getting needed rubber into this country may be jeopardized.

Mr. Litchfield made his statement as he and his associates informally observed the fortieth anniversary of his service with Goodyear. During those forty years he has directed the purchase and processing of one-eighth of all of the rubber produced in the world up to this time. It was pointed out that probably no other single man has exerted such a direct influence over a widely consumed commodity.

Forty years ago Litchfield joined the then struggling company as its production head. Since 1927 he has been president and the company has become the world's largest manufacturer of rubber products. He is a native of Boston and a graduate of Massachusetts Institute of Technology. Under his direction the modern straight side automobile tire, the pneumatic truck tire and the pneumatic farm tractor tire were developed and placed upon the market.

### *Anticipates Aircraft Development*

To keep in touch with the far flung interests of his company during recent years, Mr. Litchfield has done most of his traveling by plane. He believes that every young American should learn to fly and anticipates a development of aviation during the next few years which will parallel that of the automobile industry.

## RECORD ATTENDANCE AT AKRON GROUP OUTING AT SILVER LAKE CLUB

**UPPER LEFT: A. E. Sidnell (Seiberling Latex), William Whitaker (Herron & Meyer), R. E. Long (Seiberling Latex), and S. S. Caldwell (Thompson-Weinman) all set for putting. UPPER RIGHT: E. E. DeBolt (Packard Electric), W. S. Campbell (Dugan & Campbell), H. J. Osterhof (Goodyear) and F. A. Bonstedt (Binney & Smith) using Jake Rupert (Monsanto) as a tee. CENTER: View of the crowd in the banquet hall. LOWER LEFT: M. Achterhof (Ohio Rubber), W. W. Vogt (Akron Standard Mold), H. J. Miller (Goodyear), H. Conroy (General Tire), and A. Tomlin (Monsanto) engaged in a "buying and selling" act. LOWER RIGHT: George Price (Goodyear), L. F. Body (Dill), B. Gammel (Polson Rubber), and R. D. Woolsey (Polson Rubber) talking it over. All photos supplied by Akron Rubber Group.**

A record attendance was set at the outing of the Akron Group, Rubber Division, A.C.S., held at the Silver Lake Country Club in Akron on June 14. Approximately 500 members and guests came to dinner while some 250 participated in the golf tournament, always the major attraction at the outings of the group.

The early birds started with an *a la carte* luncheon and played golf, but there were several special handicaps provided. For instance, all players had to tee off the Number One Tee with a club with a head about the size of a large rock. Other stunts were provided at various holes on the course, making putting especially difficult. Skeet shooting was also indulged in during the day. Prizes were awarded to winners in the golf tournament, as well as to holders of lucky numbers.

Jack B. Waite, of Dugan & Campbell, was general chairman of the outing. Those in charge of various responsibilities were: *Tickets,* W. H. Vance (Dugan & Campbell); *Golf,* L. V. Cooper (Firestone); *Prizes,* C. B. Moore (Philadelphia Rubber Works); *Entertainment,* C. F. Marshall (Barnwell); *Refreshments,* Ferd Bonstedt (Binney & Smith); *Information,* Verne Smithers (V. L. Smithers); *Publicity,* William S. Campbell (Dugan & Campbell). The three officers of the group, Ralph LaPorte (Seiberling), president, H. V. Powers (Goodyear), vice-president, and T. Stevens (C. P. Hall), secretary-treasurer, were on hand at the outing.

Companies contributing to the exceptionally large list of prizes follow: American Cyanamid, Akron Chemical, Akron Paint & Varnish, Akron Standard Mold, Aluminum Company of America, American Zinc Sales, Adamson Machine, Anaconda Zinc Oxide, L. Albert & Son, Binney & Smith, Bridgeport Brass, Bridgwater Machine, Barrett, Barnsdall Oil, Carbide & Carbon Chemical, Columbia Chemical, Continental Carbon, Cannon Mills, Continental Rubber, Colonial Insulator, Central Rubber, Carter-Bell, Dill Manufacturing, Dow Chemical, Dugan & Campbell, Eastern Magnesia Talc, Erie Railroad.

DuPont, English Mica, Forbes Varnish, Russell Farley, Farrel-Birmingham, Cabot, General Magnesite & Magnesia, Grasselli Chemical, Herron & Meyer, J. M. Huber, C. P. Hall, International Pulp, Imperial Oil & Gas, *India Rubber World,* Manufacturers Rubber Supply, F. F. Myers, Monsanto Chemical, H. Muehlstein, Midwest Rubber Reclaiming, N. J. Zinc, Niagara Sprayer, National Rubber Machinery, National Standard, Naugatuck Chemical, Ozark Smelting, Ohio Sherardizing.

Piqua Stone Products, Pequanoc Rubber, Philadelphia Rubber Works, RUBBER AGE, Superior Zinc, A. Schrader's Son, Shell Oil, Southeastern Clay, Stamford Rubber Supply, St. Joseph Lead, H. S. Stoller, Standard Oil, A. Schulman, Southern Acid & Sulphur, Standard Ultramarine, F. E. Schundler, Stauffer Chemical, Thompson-Weinman, Thiokol, Titanium Pigment, Turner-Halsey, United Carbon, Vultex Chemical, C. K. Williams, Charles T. Wilson, Wishnick-Tumpeer, Charles White, Xylos Rubber.

### Boston to Hold Outing

A complete program of sports activities, including a golf tournament, has been planned for the annual outing of the Boston Group, Rubber Division, A. C. S., which will be held on July 19 at the Weston Golf Club, near Weston Center, Mass. Free beer will be served all afternoon and the day's activities will be topped off by a big dinner, with either lobster or steak offered. Prizes will be awarded to winners of the various sporting events. Joe Haas, of the Hodgman Rubber Co., is chairman of the outing committee. Tickets, $2.00 to members and $3.00 to non-members, may be secured from the secretary-treasurer of the group, Donald D. Wright, c/o Hood Rubber Co., Watertown, Mass.

### Chicago Outing on July 20

A golf outing will be held by the Chicago Group, Rubber Division, A. C. S., on July 20 at the Lincolnshire Country Club, near Steger, Illinois. Other sports activities will also be featured, with prizes offered to winners of the various scheduled events. The Lincolnshire club has three 18-hole golf courses, two swimming pools, a baseball field and tennis courts. Transportation is available either by automobile or the Illinois Central Suburban train to Dixie Highway where buses from the club will pick up members and guests upon the arrival of each train. Golfers may start as early as they wish and lunch will be served to those desiring it. Dinner will be served in the evening.

### Organize New Roll Concern

Precision Roll & Rubber Company has been organized at Yardville, N. J., by Robert Spreat and T. D. Dantzler, both formerly associated with the L. H. Gilmer Company. The new company, which is occupying the former plant of the Thiokol Corporation, will manufacture rubber-covered and other rolls, as well as certain types of mechanical goods.

# NEW YORK RUBBER GROUP HOLDS SUCCESSFUL OUTING IN WESTCHESTER

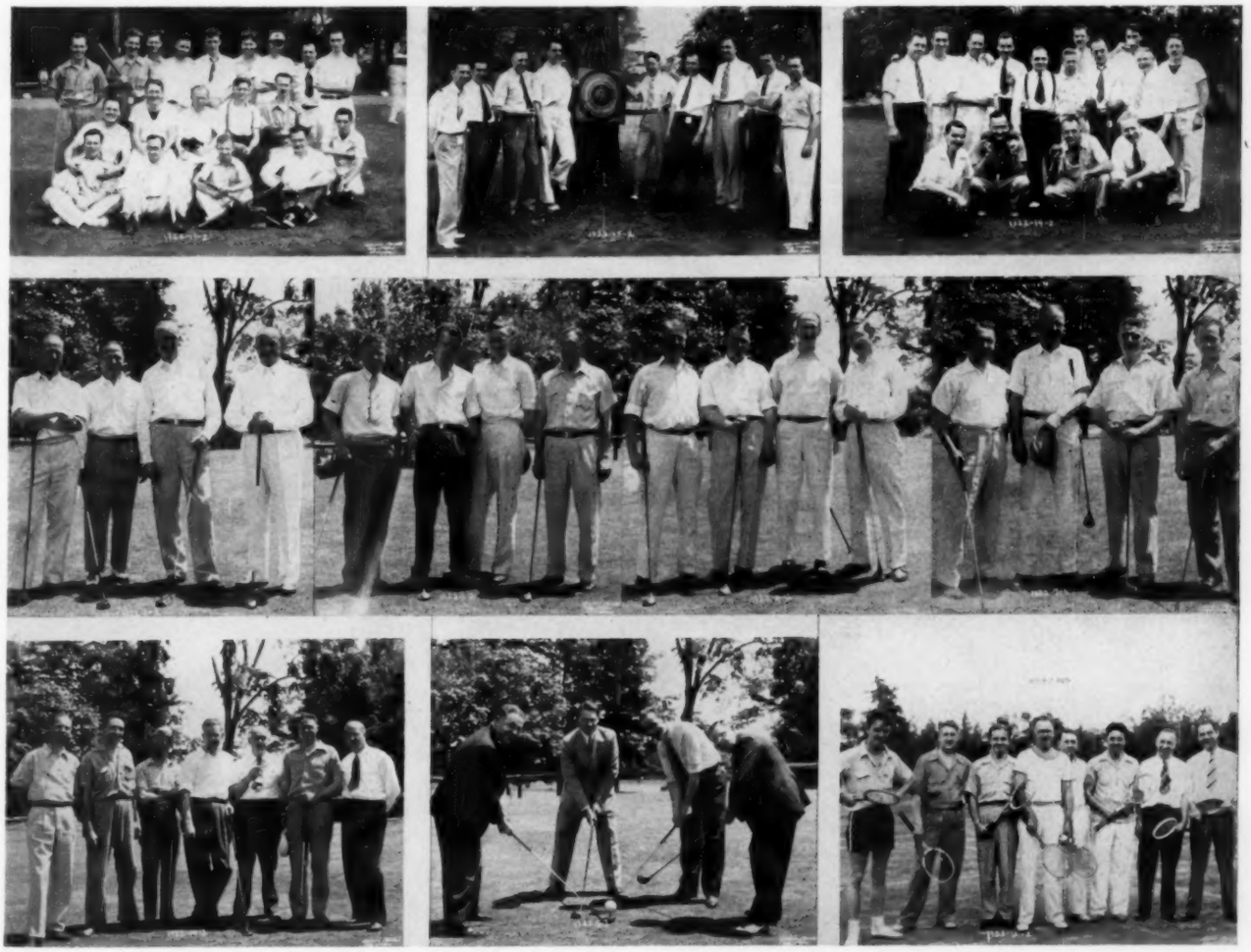
Approximately 185 members and guests attended the annual outing held by the New York Group, Rubber Division, A.C.S., at the Green Meadow Club, in Harrison, Westchester, New York, on Friday, June 14. Although departing from previous practice in that it was held on a Friday rather than on the customary Saturday and that it was the first one held in Westchester County, the outing was generally termed one of the most satisfactory held to date by the group. It got under way early in the afternoon and wound up with an excellent dinner. A full program of sports was enjoyed during the day, with practically every member and guest participating in one event or another. Prizes, purchased by the group from treasury funds, were distributed to winners and runners-up in all events. In the golf tournament, E. B. Curtis (Vanderbilt) won low gross, A. Partington (Passaic Rubber) won the kicker's handicap, and A. C. Lindaw (American Cyanamid) received a consolation prize. Winners of other events follow:

*Boccie,* team of T. A. Bulifant and A. W. Browne, both of Barrett; *Tennis,* D. H. Comes (Farrel-Birmingham), John H. Ball (Vanderbilt) runner-up; *Horseshoes,* W. F. Lamela (Okonite), B. W. Bender (U. S. Rubber) runner-up; *Darts,* W. C. Cooper (Imperial Color), W. F. Lamela (Okonite) runner-up; *Baseball Throw,* W. B. Atchison (Pequanoc), A. J. Schoor (Vanderbilt) runner-up; *Clock Golf,* J. H. Nesbit (U. S. Rubber Reclaiming), W. F. Tuley (Naugatuck) runner-up. In addition to these events, soft ball games were played between pick-up teams and a tug-of-war was held. Door prize of the day, a portable radio, was won by L. J. Plumb (U. S. Rubber Reclaiming). A special prize, consisting of an exceptionally large package, the contents of which was not disclosed, was given to John Drucker (Flintkote) for setting the all-time record for the group by striking out four times in a row in one of the soft ball games.

J. de C. Van Etten, of Vansul, Inc., was chairman of the outing. Those in charge of the various events follow: *Golf,* F. F. Salamon (Binney & Smith); *Boccie,* J. H. Carroll (R. E. Carroll, Inc.); *Tennis,* M. E. Lerner (RUBBER AGE); *Horseshoes,* W. F. Lamela (Okonite); *Darts,* S. C. Stillwagon (*India Rubber World*); *Baseball Throw,* A. J. Northam (DuPont); *Clock Golf,* A. R. Kemp (Bell Telephone Laboratories); *Soft Ball,* J. Miscall (Flintkote); *Tug-of-War,* L. D. Ackerman (Seamless Rubber); *Beer,* L. D. Walker (Triangle Conduit). Peter P. Pinto (RUBBER AGE), secretary-treasurer of the group was in charge of the registration desk, assisted by P. P. Murawski (DuPont), B. B. Wilson (*India Rubber World*), and W. G. Coe (RUBBER AGE).

### Brown Elects New Officers

E. A. Callanan was elected president and treasurer of the Brown Rubber Co., Inc., of Lafayette, Indiana, at the recently held annual meeting of the company. D. Schultze was elected secretary and assistant treasurer, and H. T. Holsapple, assistant secretary. A 61% gain in sales for the first four months of the current year as compared with the same period in 1939 was reported.



*A few "shots" taken at the New York Group Outing showing some of the activities indulged in by members and guests.*

# NAMES IN THE NEWS

ROBERT A. BLACK has resigned as export sales manager of the Pioneer Rubber Co., Willard, Ohio. He was injured in an automobile-train collision early this year and has never fully recovered his health.

E. D. NATHAN, formerly assistant advertising manager of the tire division of the B. F. Goodrich Co., Akron, has been named sales promotion manager of the company's tire sales department. He has been with Goodrich since 1925.

H. S. WHERRETT, president of the Pittsburgh Plate Glass Co., has been elected president of the Columbia Alkali Corp., a subsidiary, succeeding HUGH A. GALT, who retired recently. Columbia Alkali is the sales agency for the Columbia Chemical division of the Pittsburgh concern.

STACY G. CARKHUFF, secretary, Firestone Tire & Rubber Co., Akron, was injured in an automobile accident on June 16. The automobile in which he was riding left the road, plunged into a ditch, and hit a tree. He is reported to be recuperating. MRS. CARKHUFF was hurt in the same accident.

GORDON C. MACK, of the patent department of the Goodyear Tire & Rubber Co., announces that he is continuing the patent law practice of the late ROBERT M. PIERSON in the Akron Savings & Loan Building, Akron.

HENRY H. CLAPP, who was associated with the Lee Rubber & Tire Corporation from 1926 to 1938, and who spent the last two years working on rubber developments in Colombia, South America, has joined the L. H. Gilmer Co., Tacony, Philadelphia, Penna., as chief chemist.

D. F. "DON" CLASH, who has been connected with the Acorn Insulated Wire Co., Brooklyn, N. Y., for the past few years, has resigned from that organization and has joined the General Cable Corporation.

WALTER E. SHIVELY, manager, tire design, Goodyear Tire & Rubber Co., Akron, completed his twenty-fifth year of service with that company last month. He was presented with his service pin by C. C. SLUSSER, vice-president and factory manager.

A. J. STREAM has been appointed assistant general manager of the Plant Rubber & Asbestos Works, San Francisco. He has been with the company for the past eleven years, starting as a salesman in the Los Angeles office.

ALLYN I. BRANDT, associated with the Philadelphia Rubber Works, Akron, for the past several years, has been appointed general sales manager of that company. MR. BRANDT, who has had active experience in the field of reclaimed rubber for the past ten years, is currently serving a second term as president of the Rubber Reclaimers Association.

RUSSELL DEYOUNG, who commenced working at Goodyear in 1928 while taking Akron University's co-operative engineering course, has just been appointed assistant to the president of the Goodyear Aircraft Corporation and of Goodyear Foreign Operations, Inc. MR. DEYOUNG, at 31, becomes the youngest member of the Goodyear management.

LESLIE D. CARVER, formerly chief chemist for the Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Canada, has joined the General Cable Corporation at its Rome, N. Y., plant. Prior to going with Dunlop, he was connected with the Canadian General Electric Co., and prior to that with Gutta Percha & Rubber, Ltd.

SHERMAN DALRYMPLE, president, United Rubber Workers of America, has been appointed to the advisory staff of SIDNEY HILLMAN, member of the National Defense Advisory Commission recently organized by PRESIDENT ROOSEVELT. The task assigned to MR. HILLMAN's group is the training of 150,000 workers for defense industries.

W. I. BURT, manager, chemical manufacturing plant, B. F. Goodrich Co., Akron, was elected chairman of the Akron Section of the American Chemical Society, at a meeting of the Section held on June 16. WINFIELD SCOTT, chemical research department, Goodyear Tire & Rubber Co., was named vice-president.

J. S. DOYLE, who joined the Johns-Manville Corporation in 1928 in the electric railway and motor bus department, has been appointed automotive staff manager of that company, succeeding the late B. E. BLAISDELL. He is a graduate of Dartmouth and took post graduate work at Columbia University.

EDGAR M. QUEENY, president, Monsanto Chemical Co., St. Louis, Mo., has announced that until the November election he will serve his company only half time and receive only half pay so that he can devote the balance of his time and energy in behalf of the presidential candidacy of WENDELL L. WILLKIE.

## Vaught Named Goodrich Treasurer

GEORGE W. VAUGHT

George W. Vaught, formerly treasurer and a director of Montgomery Ward and Company, was elected a vice-president and treasurer of the B. F. Goodrich Company on June 27. He assumed his new duties on July 1. At the same time it was announced that V. I. Montenyohl, treasurer of Goodrich since 1926, has been elected a vice-president.

Mr. Vaught was born in Palestine, Texas, studied at Southwestern University, and began his career teaching mathematics in college and in various Texas high schools. He later entered industry and when he joined Montgomery Ward in 1917 he brought with him a background of banking and sales experience. He rose rapidly with the mail order concern, being named assistant treasurer and credit manager in 1931, elected treasurer in 1933, and made a director in 1936.

Mr. Montenyohl has been with Goodrich since 1907, his first job having been as a stenographer in the credit department. In 1920 he became assistant treasurer, in 1926 treasurer, and in 1928 a director. In 1931 Mr. Montenyohl became president of the International B. F. Goodrich Co., which handles the foreign business of the parent company.

HOWARD L. HYDE, attorney, has been named general counsel and assistant secretary of the Goodyear Tire & Rubber Co., Akron, to succeed the late FRED R. WAHL. He is a member of the law firm of Thompson, Hine & Flory of Cleveland.

F. C. THORN, chief chemist, Garlock Packing Co., Palmyra, N. Y., has an interesting article on "Standardization in the Field of Mechanical Packing" in the May, 1940, issue of the *A.S.T.M. Bulletin*.

## RUBBER COMMITTEE REPORTS AT A.S.T.M. ANNUAL MEETING

Committee D-11 on Rubber Products presented its report on activities during the past year at the 1940 Annual Meeting of the American Society for Testing Materials, held in Atlantic City, N. J., June 24 to 28. The registration at the meeting totalled 1,440, exceeding the previous meetings held in Atlantic City and second only to the attendance recorded at the meeting held in New York City in 1937. In all, 22 formal technical sessions were held during the five-day meeting, with more than 250 committee gatherings.

The report of Committee D-11 included four new tentative standards. There was a brief reference to the three new standards approved late last Fall by the Society covering methods of testing sponge rubber products (D 552-39 T), hard rubber products (D 530-39 T), and the methods of test for viscosity and total solids content of rubber cements (D 553-39 T). In all cases these tentative standards represent the first effective standardization effort in connection with quality control of the materials involved.

Two of the new test methods approved at the meeting were developed by Committee D-11's Technical Committee A on Automotive Rubber which is sponsored jointly by the Society of Automotive Engineers and the A.S.T.M. One covers testing of automotive hydraulic brake hose and the other is a test for compression-deflection characteristics of vulcanized rubber. The specifications for brake hose have been referred to the S.A.E. for inclusion in its standards. These standard requirements and testing procedures meet urgent demands from automotive engineers and state highway departments for suitable requirements for the control of hydraulic brake hose used on licensed vehicles on the highways.

Testing requirements for hydraulic brake hose cover volumetric expansion under pressure, bursting strength, fatigue life, and tensile strength. The test procedures for determining the compression-deflection characteristics of vulcanized rubber compounds involve two procedures, one in which the load required to cause a specified deflection is determined, the other in which the specified weight or compressive force is placed on the specimen and the resulting deflection is measured and recorded.

Two other new tentative standards cover tests for accelerated aging of vulcanized rubber by the oxygen-pressure method at 80°C. and specifications for insulated wire and cable (ozone-resistant insulation). Five tentative standards are to be referred to the Society ballot for adoption as standard. These cover the abrasion resistance of rubber compounds (D 394-37 T) modified by the elimination of tests by certain machines and the test for accelerated aging of vulcanized rubber (D 428-36 T) by which the existing standard is to be separated into two items, one the oxygen-pressure-chamber method, the other the oven method.

Also to be adopted is the test for flexing of rubber products (D 430-35 T), one change of which will delete the word "flexing" from the title which will read "Standard Methods of Dynamic Testing for Ply Separation and Cracking of Rubber Products." The air pressure heat test of vulcanized rubber (D 454-37 T) and the specifications for rubber gloves for electrical workers on apparatus or circuits not exceeding 3000 volts to ground (D 120-37 T) are to be adopted.

The committee expects to submit additional standardization procedures and specifications to the Society later in the year, one of these to determine the tearing resistance of vulcanized rubber, another for calibrating light source, and another for testing rubber specimens under artificial light as part of a life test program.

Lewis Larrick, of the Physical Research Laboratory, B. F. Goodrich Co., discussed the standardization of durometers in a technical paper. He referred to a number of the instruments in use and some of the problems involved, including lack of agreement among the instruments and even comparison of the same type of instrument. Standardization of a program on one of the durometers which has been in use for several years was discussed.

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Continental Carbon Company has just added ten tank cars to those used to transport the company's carbon black from its Sunray, Texas, plant. The Texas plant was put into operation four years ago.

### Marine Chemicals Changes Name

In order to better express the nature of the company's business, which is confined exclusively to the production of technical and U.S.P. magnesium salts from sea water, including carbonates, hydroxides and oxides, the Marine Chemicals Company of South San Francisco, California, has changed its name to the Marine Magnesium Products Corporation.

Organized in 1927 by R. E. Clarke, who has been president and general manager since its inception, the company is said to be the first in the world to produce commercially any products directly from sea water except common salt. After two years of research and development, commercial operations were started in July, 1929.

According to Mr. Clarke there has been expended over a half-million dollars to bring to perfection the "Marine" process, which is now covered by more than 20 United States and foreign patents. During the past year the capacity of the South San Francisco plant has been practically doubled and the quality of the products greatly improved. Shipments are made in carloads to manufacturers throughout the nation under the trade name "Marinco."

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### Standard Chemical Names Agent

The Standard Chemical Co., manufacturers of mold lubricants and other products for the rubber compounding industry, with headquarters in Akron, has announced the appointment of the Weller Chemical Co., 141 Milk St., Boston, Mass., as its New England representative.

## TOTAL 915 YEARS OF ACTIVE SERVICE IN THE FIELD OF RECLAIMED RUBBER

The individuals pictured in the above reproduction represent 915 years of service spent in the employ of the U. S. Rubber Reclaiming Co., Inc., manufacturers of reclaimed rubber, with factory in Buffalo and general offices in New York City. The occasion for the photograph was the celebration of Oldtimers Night by the Foremen's Club of the company, held at the Hotel Lennox in Buffalo on Wednesday, June 26th. Only those with a service record of 25 years or more may become members of the company's Oldtimers Club. L. J. Plumb, president, delivered a brief address at the celebration.

# LOS ANGELES NEWS

A. D. McPherson, who has been manager of the purchasing department for the Los Angeles plant of the B. F. Goodrich Company, has been transferred to the Akron plant. He has been a resident of Los Angeles since February, 1928. The name of his successor has not been announced. Mr. McPherson has been one of the most active members of the Los Angeles Rubber Group for many years.

Harold W. Rehfeld of the B. F. Goodrich Company left on June 15 for a month's business and pleasure trip in the East. His schedule called for several stops.

James Tew, former president of the B. F. Goodrich Company, spent some time in Los Angeles this month while en route to various points on an extended trip.

The Latex Seamless Products Company, operated by Carl E. Stentz at 4620 East Washington Street, has greatly increased its capacity recently by adding both new machinery and new employees. Mr. Stentz says business is good and getting better.

The Santa Fe Rubber Mills, 609 Santa Fe Avenue, reports a fine increase in business. James W. Stull, who has been spending time both inside and outside, is now devoting all of his time to outside sales.

Bill Reeder, purchasing agent for the U. S. Rubber Company, spent a few days in the San Francisco area this month, the chief purpose of his visit being to see his daughter, Virginia, graduate from Leland Stanford University.

Dave Adams, manager of the rubber shop for the W. B. Elfstrom Company, 2300 East 48th Street, left on July 3 for Chicago to visit friends and look after business matters.

Among Alaska tourists this month have been T. Kirk Hill, president of the Kirkhill Rubber Company, and Dick Bolding of the Union Rubber Company. However, they did not go together.

Ed Royal, local manager for H. M. Royal, Inc., left June 27 for Seattle and was scheduled to return July 20. The trip was 80 per cent business and 20 per cent deep sea fishing.

The Caram Manufacturing Company is in the process of moving from its old location at 916 East 59th Street to a new home at 1125 East 63rd Street. The new business location, in a comparatively new group of buildings, offers 11,000 square feet of floor space, about three times the amount of space previously occupied. This company which has been in business only since 1933, has had a remarkable growth under the direction of the owner, E. D. Caram. The leading items manufactured are rubber soles and cement. New machinery is being installed.

The Golden State Rubber Mills, 651 East 61st Street, has been having success in marketing a device known as an "Occluder." This takes the place of the old fashioned patch that occulists formerly used to shut light out of the eye. The new device by means of a vacuum cup attaches firmly to the inner side of the lenses in the glasses and a spreading bell-shaped rubber patch fits tightly over the eye. The item is already being distributed over most of the United States through occulist supply houses.

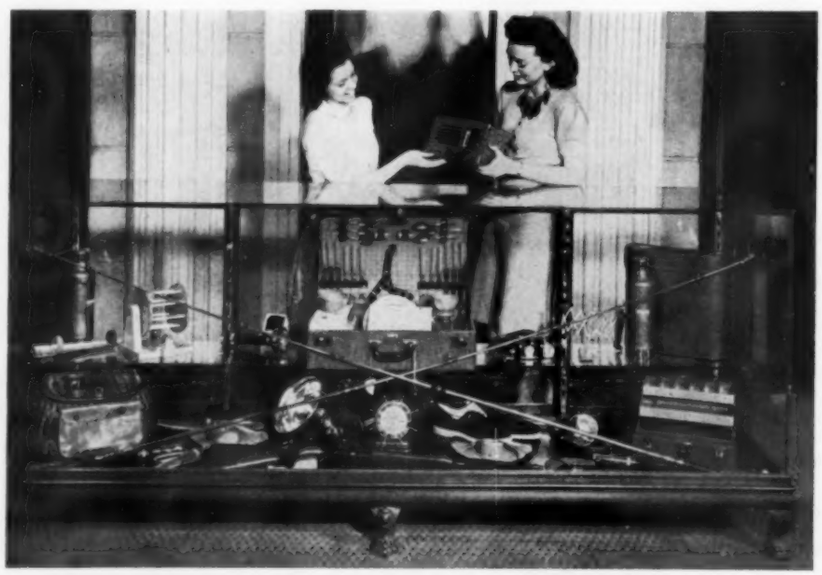
Phil Drew, of Goodyear, president of the Knox College alumni group in Los Angeles, was the star in a premiere showing of "Those Were the Days" at a theatre in Westwood Village (Los Angeles) recently, the honor coming to him because of his connection with that alumni group. He was given the honor of sitting in a 1904 model automobile with the movie star Jean Cagney and being photographed for newspapers. Mr. Drew is chief chemist at the Goodyear plant.

### General Tire Strike Ended

After a long and stormy session, members of the General Tire union local voted on June 25 to end the 12-week strike and approved a new agreement with the company. The decision to end the strike was made by a vote of 548 to 119. The new agreement, according to union leaders, has definite improvements, particularly in a clarification and strengthening of machinery for settlement of grievances. The union originally alleged that an accumulation of unsettled grievances was the principal cause of the strike while the company contended that the unionists had violated the existing contract by striking. At the same time settlement of the strike was announced, General Tire revealed plans for the construction of a new five-story addition to its Akron plant. The addition will be used for warehousing, shipping and receiving, and will relieve sufficient pressure on the present building to provide for a one-third increase in production capacity.

### Form National Latex Products Co.

The National Latex Products Company has been organized at Ashland, Ohio, by H. R. Gill and a group of associates. Mr. Gill, who heads the new company as president, is said to have founded the first company in this country for the exclusive manufacture of toy balloons more than twenty-seven years ago, and for many years has been president of the Eagle Rubber Co. At present, National Latex Products is engaged in the manufacture of "Blue Bird" toy balloons, but expects to manufacture other latex products in the future.



*Some of the interesting prizes which were distributed to winners of various events in the deep sea fishing excursion held by the Los Angeles Rubber Group last month. They were displayed in the lobby of the U. S. Rubber Company's factory.*

## GOLF TOURNAMENT FEATURES OUTING OF RHODE ISLAND CLUB

An interesting golf tournament, in which approximately 50 members and guests participated, with prizes to the winners of various events, featured the outing of the Rhode Island Rubber Club, held on June 21 at the Wannamoisett Country Club in Rumford, R. I. Approximately 85 members and guests attended the outing.

Winners of the golf tournament were: *Low Gross,* F. F. Salamon (Binney & Smith), Ray Newall (Respro), and J. W. Morrisey (Hookless Fastener); *Low Net,* R. Cowen (Qaubaug Rubber) tied with James Mason (Qaubaug Rubber), W. Shaw (Shaw Motors), and T. Durkin (Merchants & Miners); *Kicker,* E. L. Hanna (Davol), S. J. Lake (Respro), A. Davis (Goodyear Footwear), and J. Marshall (Collyer Insulated Wire). Mr. Marshall was in charge of the golf arrangements while the Prize Committee consisted of Charles Berlow (American Wringer), L. K. Youse (Firestone) and A. J. Davis (Goodyear Footwear). A consolation prize, for taking the most strokes on one hole, went to J. Murray (Anaconda Zinc Sales).

After an excellent dinner was served in the evening, the group was addressed by Dr. Theodore Collier, Professor of History and International Relations of Brown University, Providence, on "What Is the War About?" Dr. Collier traced the history and background of some of the present belligerent countries, dwelt on the fact that no one single nation has ever been able to organize Europe, and then discussed the possible moral effect of the break between France and England on the United States. The talk was, of course, largely theoretical.

Companies contributing to the prizes distributed at the outing follow: Akron Standard Mold, J. H. Best, Brockton Cutting Die, Callaway Mills, Cannon Mills, Carpenter-Morton, Curran & Barry, DuPont, General Atlas Carbon, Gair Cartons, Howe & French, Ernest Jacoby, J. & L. Electric, John D. Lewis, Johns-Manville, H. Muehlstein, Pequanoc Rubber, Respro, Rohm & Haas, A. Schulman, Shaw Motors, Shoe Hardware, Southeastern Clay, Stamford Rubber Supply, Titanium Pigment, Union Equipment & Supply, U. S. Rubber Reclaiming, Vansul, L. G. Whittemore, Wishnick-Tumpeer, Woodward-Baldwin.

### Participate in Symposium

Two Goodrich chemists participated in the research symposium held during the week of July 8 at Gibson Island, near Baltimore, Maryland, under the auspices of the American Association for the Advancement of Science. Dr. W. F. Busse, director of physical research, discussed "The Effects of Temperature on Some Physical Properties of Rubber," while Dr. B. S. Garvey, Jr., delivered a paper on "Mixed Polymers and Vulcanizable Plasticizers."

### Auburn Package Awarded Prize

The new and novel folding carton recently adopted by the Auburn Rubber Corporation, Auburn, Indiana, for its boxed sets of toys and novelties, was awarded Grand Prize in the Third National Toy Packaging Contest sponsored by the magazine *Toys & Bicycles.* The carton, in which can be packed such assortments as farm animals, soldiers, baseball characters, trains, and farm implements, is convertible to a counter or window display, as can be visualized from the accompanying illustration. The carton was conceived and designed by Martin Ullman, of New York City, leading package designer. Mr. Ullman has also designed new packages for other Auburn products.

# FINANCIAL NEWS

## FIRESTONE'S SIX-MONTH REPORT SHOWS NET PROFIT OF $2,565,661

Operations of the Firestone Tire and Rubber Company and subsidiaries for the six-month period ended April 30 resulted in a consolidated net profit of $2,565,661 after depreciation, interest, Federal income taxes, and provision of $500,000 additional reserve for future declines in foreign exchange and other contingencies, according to the report made last month by John W. Thomas, president. This is a drop of $285,877 from the $2,851,538 earned in the corresponding period of the previous year.

After allowing for dividend requirements on the 6% preferred stock, the profit is equal to 60 cents each on 1,933,992 shares of $10-par common stock. It was pointed out that the current period's earnings include profits of foreign subsidiaries and an equivalent amount in dividends was remitted to the company.

### RAYBESTOS-MANHATTAN, INC.

First Quarter: Net profit of $434,441, equal to 68 cents each on 631,200 shares of no par capital stock, which compares with $316,401, or 50 cents each on 632,000 shares, reported for the corresponding period in the previous year.

## TRADE COMMISSION CHARGES MONOPOLY TO ERASER MAKERS

Six corporations, constituting practically all of the manufacturers of rubber erasers in the United States, were charged with having established and maintained a combination and agreement to fix and maintain prices, terms and bids in connection with the sale of such products, by the Federal Trade Commission on June 26.

It is alleged that, prior to November, 1935, the respondents entered into an agreement to fix and maintain, and that they have fixed and maintained, the prices at which their product is sold, and the uniform terms and conditions governing such sales, and that they agreed to submit and have submitted, directly and through their agents, uniform and identical bids on their product when requests were made for such bids.

The complaint points out that many firms and corporations and Federal, State and municipal governments, because of the substantial quantity of rubber erasers used, purchase them through invitations for bids, and that from these bids are selected the members of the rubber eraser industry from whom purchases will be made for given times or in stated quantities.

The complaint alleges that the effect of the respondents' practices has been to monopolize for them the business of manufacturing and selling rubber erasers; to unreasonably lessen, eliminate and restrain competition in this field in interstate commerce, and to deprive the public of advantages of price, service and other considerations which it would otherwise receive.

The respondent companies are American Lead Pencil Company, Hoboken, N. J.; Eagle Pencil Company, Inc., New York; Joseph Dixon Crucible Company, Jersey City; Eberhard Faber Pencil Company, Inc., Brooklyn; and the Weldon Roberts Rubber Company and A. W. Faber, Inc., both of Newark, N. J.

Baby pants treated with Koroseal have been introduced by the Warren Featherbone Co., Three Oaks, Mich. The special coating makes them waterproof, acidproof, sunproof and impervious to cracking or stiffening with age. Amity Leather Products Co., West Bend, Wisconsin, has also taken a license to "koroseal" certain of its famous leather products.

The name of the National Battery Manufacturers Association has been changed to the Association of American Battery Manufacturers, Inc. V. L. Smithers, of the laboratory bearing his name in Akron, Ohio, is Commissioner of the Association.

Two new high-mileage truck tires, the Hi-Miler Rib and the Hi-Miler All-Weather, have been announced by Goodyear. Both are truck and bus tires intended for general on-the-road service.

# CANADIAN NEWS

Wilford B. Jonah, formerly of the Canadian Goodrich technical staff, on August 1 will take complete charge of all compounding work on rubber and synthetic covered wire and cable for the Northern Electric Company, Ltd., Montreal.

Mr. Jonah, a native of Moncton, N. B., graduated in chemistry from Mount Allison University in 1936 and joined the Goodrich company shortly after his graduation. During his college days he played four years of hockey and four years of rugby and captained the hockey team in his senior year. His present hobbies include sailboating, swimming and skating. Mr. Jonah is married and has one daughter, Patricia, born on March 17 of this year.

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Increases in the prices of tires and tubes are being made by Canadian manufacturers as one result of the drastic tax bill announced by Dominion Finance Minister J. L. Ralston in his budget speech before the House of Commons at Ottawa on June 24.

The new list of sumptuary taxes released at that time includes an imposition of a flat rate of five cents a pound on all tires and tubes. Rates on these articles formerly were two and three cents a pound respectively. This means that a 6.00-16 tire and tube, which together weigh approximately twenty-four pounds, will now carry a tax of $1.20 instead of 51c. A breakdown of Col. Ralston's estimate of increased revenues shows that the additional tax on the two rubber products is expected to bring in $800,000 during the balance of 1940 and at least $1,100,000 in 1941.

Price increases are expected to average about ten per cent on tires and three to four per cent on tubes. Manufacturers point out that in addition to the increased poundage tax, their costs are also going to be affected by increased prices of raw materials and the ten per cent special tax on imports recently applied which affects many raw materials purchases. It is quite possible that present price increases will not be sufficient to take care of increased costs and further price boosts will be necessary.

The price change is not expected to have much effect on tire purchases since the Canadian public in general has become accustomed to thinking in terms of rising prices. It does not appear that there was any unusual amount of "loading up" and business is expected to carry on at much the usual seasonal levels.

J. A. Martin, vice-president and general manager of the Dominion Rubber Company, in commenting on the new tax bill, said: "Of course none of us like new or increased taxes but we have no other alternative in times like these. The increased taxation on tires and other rubber products was not entirely unexpected. The tax will, of course, increase the price of tires."

Ira G. Needles, tire sales manager of Canadian Goodrich, sees an increase in replacement business and a decrease in original equipment sales as another result of the tax bill. "The new tax on automobiles will surely cause limitation of new car sales and this will be enhanced, if anything, by the great demands on car manufacturers for war supplies. Therefore, as always occurs when new car sales fall off, the replacement market will grow in importance and volume to help offset the loss of equipment business," he stated.

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William Carswell, formerly comptroller of the Northern Electric Co., Ltd., Montreal, has been elected a director and vice-president in charge of accounts and finances. Mr. Carswell will take the place of J. D. Hathaway who has retired after fifty years of service with the company. He is succeeded as comptroller by D. M. Farish.

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Total sales of Canadian Goodyear in the first six months of 1940 made a "very favorable" comparison with sales for the corresponding period of 1939, states President A. G. Partridge, in a letter to shareholders accompanying quarterly dividend checks. Payment of 1¼% on the 5% cumulative preferred and 63c on the common was made on July 2 to shareholders of record on June 15.

"While completed reports for the first six months are not yet available," Mr. Partridge stated, "our total sales for this period will compare very favorably with the same period of 1939 and earnings will continue to exceed dividend requirements." The Goodyear president points out that this favorable position is partly explained by the fact that in Canada new car and truck registrations are over 30% ahead of 1939.

*Financial Counsel*, of Toronto, reports that Goodyear in recent weeks has purchased sufficient of outstanding preferred shares to use up a $250,000 sinking fund accumulated for this purpose. Under the provisions securing the preferred issue, a sinking fund of 8% of the annual net profits, but an amount not exceeding $60,000, is provided for redemption of preferred stock at $52.50 a share and accrued dividends.

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A marked acceleration was recorded in Canada's imports of crude rubber in April when the total was 6,856,788 pounds, valued at $1,432,385, in comparison with 3,284,596 pounds, worth $505,723, in April, 1939. Of the April total, 6,257,976 pounds came direct from the Straits Settlements, 255,390 pounds from Ceylon, and 343,422 pounds were imported by way of the United States. For the first four months of 1940 Canada imported 31,612,559 pounds of crude, a 71.4% increase over the same period in 1939.

**WILFORD B. JONAH**

**joins Northern Electric Co., Ltd.**

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A. R. Kaufman, president of the Kaufman Rubber Co., Ltd., has been named honorary chairman of the civic committee organized in Kitchener, Ontario, to deal with the problem of European war refugees.

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Three rubber companies in Kitchener were among the heaviest contributors to the "Buy a Tank Fund" drive held recently in that city. Largest gift of all was one of $2,071.25 from the Dominion Rubber System divided among the various plants as follows: Merchants Rubber Company employees, $935.25; Rubber Machinery Shop employees, $102; Dominion Tire employees, $625.50; Textile Division, formerly the Canadian Consolidated Felt, employees, $109; and the Dominion Company itself, $300. The B. F. Goodrich Company and employees contributed $1,350 and Kaufman Rubber company employees contributed $518.

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The Dominion Rubber Company is planning the erection of a $50,000 office building on Notre Dame Street, East Montreal, it was announced recently.

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Gutta Percha and Rubber Company, Ltd., Toronto, has recently published a sixteen-page booklet in several colors, reproducing medals and ribbons, badges of rank, and flags of the British empire. It is an excellent job of printing and a valuable handbook.

## STATUS OF FRENCH INDO-CHINA IN THE RESTRICTION SCHEME

The course of events in France in the past few weeks has raised the same question as to possible effects on international rubber regulation as was raised in connection with the Netherlands East Indies recently when Germany occupied the Netherlands. The status of the Netherlands East Indies as a participant in the regulation scheme has not been affected up to the present. The status of French Indo-China was recently discussed by E. G. Holt, Chief, Leather and Rubber Division, Bureau of Foreign & Domestic Commerce, Washington, D. C.

French Indo-China ranked third among rubber producing countries in 1939, accounting for 6.5 per cent of world production, compared to over 37 per cent each for British Malaya and the Netherlands Indies. Ceylon however still outranks Indo-China in capacity to produce, but Indo-China has been little restricted in output under the Agreement while Ceylon has borne its full share of restriction. Thailand, across the border from Indo-China, ranks fifth among rubber producers, contributing 4 per cent of 1939 world output. In recent years Indo-China has had the highest "output per planted acre" of any producing country, owing to its practically full-out production under terms of the Agreement.

Hevea plantations in Indo-China occupy about 125,000 hectares, of which 77,400 are on the so-called "terres rouges" and the remainder on gray soils. Cochinchina has 97,000 hectares; Cambodia 26,000 hectares, all on "terres rouges" and claimed by the French to constitute one of the most remarkable groups of rubber in the world; and Annam 2,000 hectares. The exports from Indo-China were reported at 65,219 long tons in 1939 when (at 2.4714 acres to the hectare) the average output per planted acre works out at 473 pounds for the country as a whole.

Indo-China and Thailand have been only nominally subject to restriction except in respect to provisions governing the planting of new areas. Indo-China has very few small native rubber gardens, the rubber being almost wholly in large European-owned estates with French and Belgian capital. Thailand, the next-door neighbor, has practically no large rubber estates, the production being almost wholly in the hands of small-holders.

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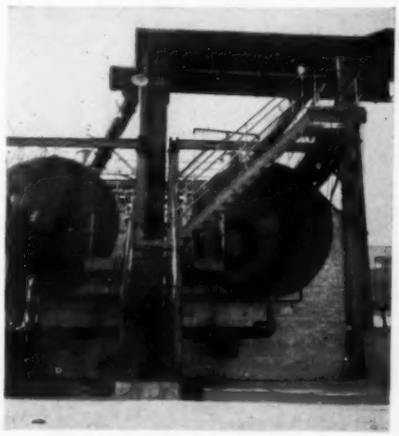
Satisfactory tests by the U. S. Army at the Aberdeen Proving Grounds in Maryland have been reported on a new Seiberling so-called puncture-proof tube. Machine gun and pistol bullets of .50 and .30 caliber were fired into the tube without affecting its serviceability. In one test, the tube continued in service for 200 miles without interruption and without additional inflation.

### An Appeal for Funds

An urgent request for contributions intended for use to relieve the situation of Dutch refugees has been made by the Rubber Division of the Queen Wilhelmina Fund, Inc., 347 Madison Avenue, New York City. The Fund not only is cooperating with the American Red Cross and the Society of Friends but is doing a great deal of relief work of its own. H. Stuart Hotchkiss, president of Cambridge Rubber Co., is president of the Rubber Division of the Fund and Frederick J. Horn is secretary-treasurer. All contributions should be sent direct to the Fund.

### Witco Asphalt Plant Opened

Climaxing the celebration of its twentieth anniversary last month, Wishnick-Tumpeer, Inc., manufacturers and distributors of compounding ingredients for the rubber, paint, ink and other fields, opened its new Pioneer Asphalt plant in Chicago. The company's new research laboratories are housed in the same plant. Located on the outskirts of the city, the new plant is so designed and transportation facilities so arranged that six tank cars may be unloaded at the same time, either into storage tanks or directly into processing operations; or may be emptied into the storage tanks and into the plant; or may be unloaded into the storage tanks while raw material is being transferred from another storage tank into the plant—all this being accomplished by a complex manifold system. All operations in the plant are controlled from a centrally situated instrument board, many of the instruments involved having been specially designed for the company. The laboratory is equipped with the latest physical and chemical testing equipment. The accompanying illustration shows part of the battery of stills at the new plant.



*Battery of Stills at Witco Plant*

## RUBBER-STEEL ARMOR PLATE IS DEVELOPED FOR AIRPLANES

Development of an armor plate of rubber and steel for use on military aircraft, which is said to be superior in bullet penetration resistance to steel armor plate of 20% greater weight, was announced last month by the United States Rubber Co. The new armor plate was developed in the laboratories of the company's Detroit plant, a new type of rubber compound being developed for the purpose.

Development of the new plate has been carried on for nearly three years, according to F. B. Davis, Jr., president of the company, who made the announcement. Old steam pipe tunnels under the plant, which covers sixty-four acres, were converted into firing ranges. Controlled experiments of comparative resistance of the familiar steel armor plate and the rubber plus steel plate, he said, "finally demonstrated that the unexpected combination of steel plus a rubber compound has resulted in a new kind of armoring with the striking weight-saving factor."

"Some of the implications of the new armoring material are of great importance and interest," Mr. Davis declared. "The turning over to manufacturers of this weight saving could be used by them for greater armament, wider armored areas, more speed, greater maneuverability or greater cruising radius.

"It is not possible to describe in detail the constituents or construction of the new armor for obvious reasons. However, it may be said that the new armor plate in our laboratory tests withstood all shots from various caliber ammunition at all ranges from 200 yards to an extremely close range. The resistance of this test plate of the new armor was equal to that of a test standard armor plate weighing 20 per cent more.

"We are ready to produce this new armor in quantity, dependent of course, upon the supply of the steel plate. And it might be pointed out that a not inconsiderable factor implied by this new plate is a potential saving of steel armor plate needed for plane armoring, which saving can be devoted to other armor plate needs."

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### Brazil to Revive Plantations

According to official announcement, Brazil will shortly launch a campaign to revive its languishing rubber cultivation industry in the Amazon Valley. President Getulio Vargas, on June 21, stated that the government had decided to repopulate rubber zones in the Amazon territory by issuing land grants and subsidies to prospective colonists. The action of the Brazilian government is considered significant in that it follows suggestions made from the United States that South America revive her dormant rubber growing industry in order to free the Western Hemisphere from dependence on sources in the Middle and Far East.

# OBITUARIES

### *Richard W. Rhoades*

Richard Winfield Rhoades, retired president and chairman of the board of directors of the R. W. Rhoades Metaline Co., Inc., Long Island City, N. Y., died at his home, 110 Villa Street, Mount Vernon, N. Y., on June 29 at the age of 83 after an illness of eight weeks. Death was due to bronchial pneumonia. Although inactive for the past twenty years, he retained his titles with the metal bearings and rubber manufacturing firm until late 1938.

Mr. Rhoades was born in the Bowery section of New York City in 1856, the son of a shoemaker. He sold newspapers in his early youth and clerked in the office of a Manhattan attorney before obtaining a position as bookkeeper with the North American Metaline Company at the age of 22. He worked his way steadily up through the ranks with the metal bearings concern and became owner of it in 1891, changing its name to the R. W. Rhoades Metaline Company in 1926.

Well known as a philanthropist, Mr. Rhoades was a director of the Methodist Hospital in Brooklyn, the Danbury (Conn.) Home for the Aged, and other institutions. He was also a director of the First National Bank of Mount Vernon, a member of the Quill Club in New York City, a former member of the board of managers of the Mount Vernon Hospital, and a former trustee of the Mount Vernon Branch of the Y.M.C.A. At one time he was a member of the Continental Bucket Co., a unit of the old Jamaica Volunteer Fire Department.

Funeral services were held on July 1 with interment in Kensico Cemetery, Valhalla, N. Y. Surviving are three cousins, B. Richard Rhoades, president of the metaline company; Norman W. Rhoades, treasurer of the firm; and Mrs. Dorothy Duerschner.

### *William A. Harshaw*

William Andrew Harshaw, founder and chairman of the board of directors of the Harshaw Chemical Co., Cleveland, died at the age of 78 on June 4. Mr. Harshaw was born in Dodgeville, Iowa, and began his career in the chemical industry in 1881. After working for several firms for a number of years, Mr. Harshaw founded his own concern, the Cleveland Commercial Company, in 1892, acting as a merchant and broker. This company was reorganized in 1898 as Harshaw, Fuller & Goodwin, and in 1929 the present name of Harshaw Chemical Company was adopted. He was active in company affairs up until his death. Mr. Harshaw was a trustee of the Case School of Applied Science and a member of the A.C.S., the Chemists' Club of New York, and the Union, Mayfield Country and Chagrin Valley Hunt clubs. He leaves a widow, three daughters, and two sons, one of whom, William J. Harshaw, is president of the Harshaw concern.

### *George S. Knapp*

George S. Knapp, partner in the rubber importing firm of Paterson, Boardman & Knapp, of New York City, died in the Lawrence Hospital, Bronxville, N. Y., at the age of 75 on July 8. Death was due to a heart attack suffered a short time before, in a bus Mr. Knapp had boarded near his Scarsdale home to go to the railroad station. Born in New York, Mr. Knapp attended public schools and then entered the importing business, remaining in that business through his entire career. He was a director of the Atlantic Mutual Insurance Company and his social activities included membership in the Sons of the Revolution and the Mahopac (N. Y.) Country Club. He was also a thirty-second degree Mason, a member of the Altair Lodge of Brooklyn where he formerly resided. A widow, son and daughter survive.

### *Percy W. Smith*

Percy W. Smith, for many years identified with tire and tube sales activities, died at his home in Brooklyn, N. Y., at the age of 55, on June 28. Born in Columbus, Ohio, Mr. Smith started and spent most of his career with the Goodyear Tire & Rubber Co. He acted as manager of that company's Columbus branch, later was transferred to the New Orleans branch, and up to ten years ago was manager of the New York City branch. In recent years, he was engaged in the real estate business in Brooklyn. He leaves a widow and a daughter.

### *Warren T. Lewis*

Warren T. Lewis, crude rubber purchasing agent for the Firestone Tire & Rubber Co., died at the age of 51 in the Akron City Hospital on June 25 following an illness of four weeks. A native of Cleveland, Mr. Lewis joined the Firestone organization in October, 1911. During the World War he was in the service and returned to Firestone at the duration of hostilities. His entire career with Firestone was spent in the purchasing department. Funeral services were held on June 27 with interment in Rose Hill Cemetery. He leaves a widow and a son.

### *George M. Kryder*

George M. Kryder, well known sales executive of the Firestone Tire & Rubber Company, and sales manager of its truck and bus tire division since 1930, died at his home, 45 Elmdale Avenue, Akron, on June 11 following an illness of several months. He completed 25 years of service with Firestone last March. Mr. Kryder was born in Akron and became associated with Firestone in 1915 after completing a chemical engineering course at the Case School of Applied Science. He spent ten years in production work and then went into the tire sales division. He was a member of the Portage Country and University clubs. Funeral services were held on June 14 with interment in Rose Hill Cemetery. A widow and son survive.

### *Charles S. Moomy*

Charles S. Moomy, founder and until recently president of the Carlisle Tire & Rubber Co., Carlisle, Penna., died on June 19 after a long illness. Mr. Moomy was born in Erie, Penna., in 1880. He entered the rubber industry as a salesman for the Keystone Rubber Manufacturing Co., of Erie, of which his father was president, and later became a vice-president. In 1917 he left Keystone and founded the Carlisle concern, which has always specialized in the manufacture of inner tubes. Mr. Moomy was active in civic and social circles in Carlisle. He was also an active member of the Rubber Manufacturers Association. Funeral services were held on June 21. He leaves a widow and one son, S. A. Moomy, associated with the Carlisle concern.

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Williams-Bowman Rubber Co., Cicero, Ill., has announced a completely new and simplified packaging program for its "Wilbow" line of rubber plumbing specialties. Colorful yellow and blue two-piece packages have replaced the old assortment of ordinary boxes. Four sizes now do the job formerly required by eight sizes in the handling of approximately 4,000 items sold by the company.

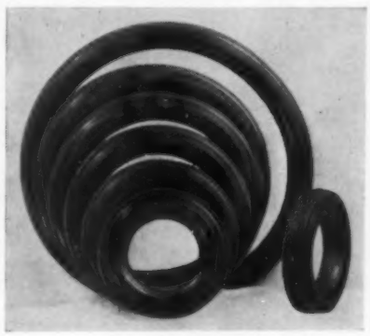
Effective July 1, Firestone reduced the price of its 4½-inch high Airtex single size latex mattress from $64.50 to $49.50 and its 3-inch high mattress from $49.50 to $39.50. Prices on the full size corresponding mattresses remain at $64.50 and $49.50. This is the first time that any mattress manufacturer has shown a marked price differential between single and full sizes.

Bibb Manufacturing Company, of Macon, Georgia, will shortly move its New York offices from Leonard Street to Two Park Avenue. It has occupied the Leonard Street quarters for the past several years and has been located in the textile district for the past sixty years.

# NEW NOVELTIES and SPECIALTIES

### Air-King Juvenile Tires

Designed to replace pneumatic tires on the better lines of juvenile vehicles, the Air-King Tire was recently introduced by the Ohio Rubber Co., Willoughby,



Ohio. Made on an entirely new principle, the details of which have not yet been revealed, the Air-King Tire will eliminate the troubles previously encountered with pneumatics, such as the valve pulling out from the tire creeping around the wheel, as well as punctures, blowouts, and excessive repairs due to underinflation, which is customary of the child owning juvenile vehicles. The new tires, which are said to have the same resiliency and cushioning effect of pneumatics, have been designed so that they are interchangeable with the juvenile tires now in use.

### Soap-Filled Rubber Novelties

Soap-filled sponge rubber novelties, die-cut in the form of animals, fish and other characters, are being sold by Bath Toys, Inc., Benton Harbor, Michigan. Each of these novelties, which serve as combination toys and wash cloths, con-

tains a generous bar of high grade baby bath soap, and is wrapped in cellophane. They are sold under the names of "Peter Rabbit," "Duckie Ann," "Oliver Owl," "Little Jack Bunny," etc., and are available in single boxes and gift box combinations.

### Creepas Sandals and Slippers

Latex foam sponge rubber soled sandals and slippers for beach, slack and house wear for men, women and children, are being manufactured by the P. A. Donahue Co., 403 East 23rd St., Los Angeles, California. Uppers consist of either duck or leather, a range of 14 colors being offered in the former and 7 in the latter. The sandals, sold under the trade-name of "Creepas," feature extreme lightness and washability. The foam sponge used is said to be made to the manufacturer's specifications, while the construction process employed was developed by Mr. P. A. Donahue, head of the company.

### All-White Non-Skid Overshoes

Industrial Products Co., 806 W. Somerset St., Philadelphia, Penna., has introduced a new all-white non-skid overshoe, manufactured to meet the need of industrial plants, dairies, creameries, packing houses, etc. The new industrial

shoe has a specially designed sole combining suction and squeegee action. Use of all-white rubber makes the shoe strictly an industrial overshoe, sanitary in appearance and unsuitable for dress wear. It is also said to be practical for outside utility service men and in any application where wet and soapy walking surfaces are met.

### New Seiberling Latex Toys

Seiberling Latex Products Co., Barberton, Ohio, recently introduced a number of new molded and blown toys, many of them with noise makers. Included were the following: Bye Bye Baby Rubber Doll, 8 inches high, decorated in colors; Sculptured Bounce Toys, each approximately 4¼ inches in diameter, featuring "Baby Face," "Wise Old Owl," and "Man in the Moon"; Walt Disney Character Toys, including Pinocchio, Figaro the Cat, Cleo the Goldfish, Jiminy Cricket, and the Donkey, all with metal reed whistles; Baby Panda, in sit-up style, decorated in red and black, with whistle; Clown, stand-up style, decorated in red and blue, with whistle; and new lines of inflated and sponge rubber play balls.

### New Oak Rubber Balloons

Several new types of balloons have been introduced recently by the Oak Rubber Co., Ravenna, Ohio. These include Hy-Glo Scenic Prints, Bomber Balloons, and Jiminy Cricket Bal-

loons. The Hy-Glo Scenic Prints represent a significant development in picture balloons. The pictures are printed in four and five colors with a varnish-like finish which gives the pictures a high gloss and lustre. The illustrations, of which ships, airplanes, motorboats and racing cars are representative, cover a greater surface of the balloon than is usual. The Bomber Balloon is shaped like an airplane. It inflates to 22 inches in length and has a wing spread of 20 inches. It is printed in two colors, with the word "Bomber" on the tail and insignia with "bombs" on the wings. These balloons, which are sold in colorful packages, are furnished with a six-inch cardboard propeller which is slipped

over the neck of the balloon after inflation. The Jiminy Cricket Balloons, the latest of the Walt Disney characters available in toy balloon form, are securable in two sizes of toss-ups, inflatable head and body balloons with cardboard feet, and in colorful prints on round and oval balloons.

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# NEW EQUIPMENT

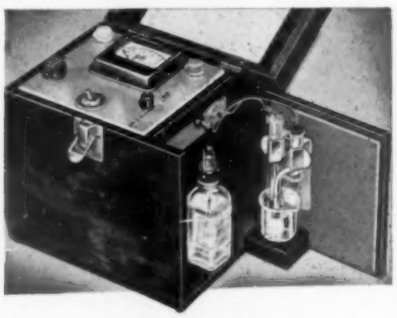
## New Type of Hydraulic Press

A new type of self-contained hydraulic press for the molding of mechanical and other rubber goods has been introduced by the Stereotype Equipment Co., 2815 Irving Park Road, Chicago, Illinois. It features

electrically-heated platens with individual thermostatic control for both upper and lower platens. The hydraulic system of the new press uses dual pumps, so that high and low pressures are always under control of the operator. Use of electrically-heated platens is said to assure close heat control, a factor of considerable importance in the production of certain rubber products, such as rubber printing plates. Various platen sizes are available.

## Cameron Glass Electrode pH Meter

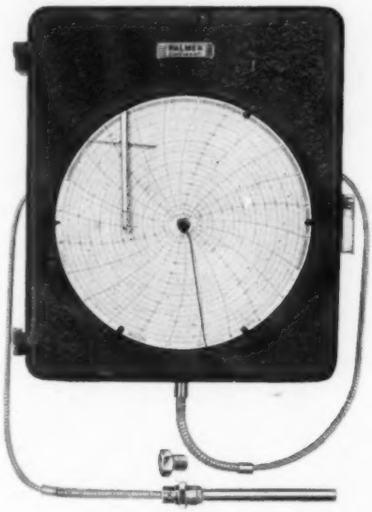
A moderately-priced glass electrode pH instrument, called the Cameron One-Two pH Tester, has been introduced by the Wilkens-Anderson Co., 111 North Canal St., Chicago, Ill. It is said to incorporate the potentiometric principle in a simple, self-contained, direct-reading instrument. It comes equipped with an electrode, ready for use with the addition of potassium chloride solution, which is supplied. A single tube am-



plifier is built in and dry batteries of stock manufacture are used. The sample is simply poured into an ordinary 30 ml. Pyrex beaker and placed on the support block. No slides, clips or clamps are required.

## Palmer Recording Thermometer

A new mercury-actuated recording thermometer has been developed by the Palmer Company, 2501 Norwood Avenue, Cincinnati, Ohio. It combines the salient



features of reliable recording instruments and introduces several new features. The pen is easy-filling while the case is constructed with the Perma-Seal door lock. Each working part of the new thermometer is said to have been designed for maximum strength. The new instrument was placed under actual field test for many months before being introduced to the commercial market.

## Unbreakable Mercury Relay

Utilizing the unbreakable metal body of the company's well-known mercury switch, and the displacement principle with solenoid actuation, an unbreakable mercury relay has been announced by Durakool, Inc.,

Elkhart, Indiana. The new relay, said to be the first unbreakable type introduced, has a hermetically-sealed contact structure, making it suitable for use in corrosive or explosive atmospheres. It may be operated up to 300 times per minute, there being little friction and

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no wear in operation. Contact resistance is as low as .002 ohms. On alternating current as little as 1 watt is required for normal closing operation, and 1.5 watts for closing; on direct current only .25 watts are required.

## "Old Faithful" Tumbling Apparatus

An efficient machine for tumbling small molded goods, which can also be used for mixing the dry or wet contents of loaded drums and for cleaning the interiors of containers with capacities from 30 to 100 gallons and maximum dimensions of 32 x 44 inches, is the "Old Faithful" Tumbling Apparatus manufactured by the Vol-U-Meter Company, Buffalo, N. Y. Either belt-driven or motor-drive, this apparatus may be operated with a 2 h.p. motor, a universal motor base being provided so that any motor of standard make can be

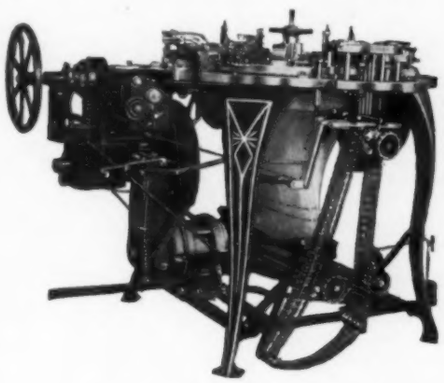
used. The design of the apparatus eliminates worm and multiple gearing. By gearing a suspending counterweight to the rotating platform on which the drum rests, a combined rotating and tumbling movement is secured. Noise, wear and vibration are said to be reduced to a minimum, and a material saving effected in initial as well as operating costs. When a drum is cleaned, it is tumbled end over end and at the same time is rotated on its own axis. This action serves to bring the entire container surface in contact with the abrasive and wash, thus reducing cleaning time without sacrificing thoroughness. Other smaller models made by the same manufacturer, which are suitable for mixing rubber cements, are pail tumblers of 5 gallon capacity and drum or barrel tumblers up to 15 gallon capacity, either belt or motor-driven.

## Schrader Tire Valve Cap

Featuring a heat-resisting washer, made especially for inner dual tires, a new tire valve cap has been announced by A. Schrader's Son, 470 Vanderbilt Avenue, Brooklyn, N. Y. Known as Tire Valve No. 440, it combines the positive air-tight unit of the standard Schrader valve cap with additional advantages for inner dual tires. The sealing washer is made of a special heat-resisting rubber compound and is molded between two dome-shaped brass plates, this construction tending to lock the cap on to the valve so vibration cannot affect it and to reinforce the washer for longer life.

## BRIEFS . . .

A new **Circular Knitting Machine** for the manufacture of fashioned rubber girdles, which is easily adjusted for light or heavyweight garments without changing needle cuts, has been introduced by the Leighton Machine Co., Manchester, N. H. Its



construction is particularly novel in that it does not operate on wheels or pattern cards, resetting of the needles being accomplished automatically. The machine may also be used for swim suits or other work.

•

Development of a complete line of **Bulk Plants** for the unloading and storage of liquefied gasses, has been announced by the Blaw-Knox Co., Blawnox, Penna. The company will design and fabricate, and, if desired, erect and place in operation unloading and storage plants for any of the commonly used liquefied gasses.

•

Soldering heat in less than a minute is the claim for a new **Soldering Iron** just announced by the Ideal Commutator Dresser Co., Sycamore, Ill. Through the use of a special carbon electrode heating element, an entirely new principle in electric soldering iron design, the tip is said to be quickly brought up to soldering temperature.

•

The development of a **Glycerine Trap** which has increased the number of cures per full circle airbag as much as 100% for many retreaders, has been announced by the Firestone Tire & Rubber Co., Akron. When this special trap is used no glycerine can escape regardless of what position the valve stem occupies, according to Firestone engineers.

•

An improved model of the **Ideal Electric Marker,** which is suitable for marking hard rubber among other products, has been introduced by the Ideal Commutator Dresser Co., Sycamore, Ill. New features are said to include a more powerful cutting stroke and a simplified stroke adjustment.

•

Union Metal Manufacturing Co., Canton, Ohio, has developed a new and unique type of **lightweight steel pallet** for use with fork lift and hand pallet trucks. By welding the corrugated cross member to the channel members, which are shaped to take the corrugations, exceptional strength and rigidity is said to have been attained.

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# REVIEWS

## BOOKS

**Practical Latex Work.** By H. J. Stern. With a foreword by R. J. Noble. Published by Blackfriars Press, Ltd., Smith-Dorrien Road, Leicester, England. 5 x 7¼ in. 104 pp. 5s. 6d (approximately $1.35). (Available in the United States and Canada from *India Rubber World*, 420 Lexington Ave., New York City, at $1.50 per copy, including postage).

During 1938 and 1939 Dr. Stern contributed a series of articles to *Rubber Age (London)* on various aspects of latex. This book is a reproduction of those articles, considerably revised and brought up to date. Although dealing with all phases of latex, from the raw material through to manufacturing costs, the author devotes the larger portion of text to problems of dipping and spreading. Numerous formulas are given while specific machinery details are discussed.

There are seven chapters in all, as follows: The Raw Material, Preparing the Mix, Compounding Ingredients, Dipping Methods and Equipment, Vulcanized Latex, Latex Spreading, and Costing in Latex Manufacture. Although amply illustrated, no bibliographical references are given. It is also to be regretted that like so many other British publications no subject index appears. Nevertheless, as Dr. Noble points out in his foreword, because developments in the latex industry occur so rapidly this book should prove of interest to all users or prospective users of latex.

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**Handbook of Procedure and Practices Under the National Labor Relations Act.** By W. A. Rinckhoff and Harvey B. Rector. Published by the Law Research Service, Keith Building, Cincinnati, Ohio. 5½ x 8¼ in. 126 pp. $7.50 (with supplementary service).

With the firm impression that the unfortunate results thus far obtained by employers and their counsel under the National Labor Relations Act are largely due to their lack of understanding of the construction of the Act and the procedure of the National Labor Relations Board, the authors undertook the preparation of this handbook. Its purpose is to define the many so-called unfair labor practices under the Act while at the same time offering suggestions, based upon actual experience, which will enable employers to avoid the innumerable pitfalls and traps into which they have stumbled in the past.

Because the fair solution of the problems confronting the employer today does not depend on what the Act is, nor its purpose, but upon a more comprehensive understanding of it, its construction, and a knowledge of proper procedure before the National Labor Relations Board and the courts, the case histories included in this handbook, as well as the definitions furnished, should prove valuable guides to both large and small manufacturers of all kinds.

•

**Rubber as an Engineering Material.** Published by the B. F. Goodrich Co., Akron, Ohio. 8½ x 11 in. 25 pp. 50c per copy.

Data on rubber as a material—its various forms, properties and limitations—is presented in concise fashion in this handbook. The material was prepared for use by the practical worker, with formulas, tables and graphs carefully avoided. Ten chapters in all are included, these being: Forms of Manufactured Rubber; Properties; Resistance to Corrosion; Resistance to Abrasion, Cutting, Tearing and Impact; Elasticity; Vibration, Shock and Noise Isolation; Heat Resistance and Insulation; Resistance to Oils and Solvents; Properties of Elastic Synthetics; and Testing of Rubber Products. Profusely illustrated, this handbook should prove of specific value to mechanical and other engineers.

**Annual Report on the Progress of Rubber Technology—1939. (Vol. 3).** Edited by T. J. Drakeley. Published by the Institution of the Rubber Industry, 12, Whitehall, London, S.W.1, England. 7¼ x 9½ in. 164 pp. Price to members: 2/6 (approximately 60c); to non-members: 10/6 (approximately $2.60).

Third in the annual reports issued by the I.R.I. to keep its members and the industry in general abreast of latest developments in all branches of the industry, from cultivation through to manufacture of finished products, this edition covers the year of 1939. As in the previous issues, coverage of each group of developments is entrusted to an outstanding authority. Complete bibliographical references permit the reader to secure further data on any particular subject, while subject and author indexes make his task still easier. The various chapters and their authors follow:

*Historical and Statistical Review,* C. J. Redfern and W. F. V. Cox; *Planting and Production of Raw Rubber, Latex, Gutta-Percha, Balata, Chicle and Jelutong,* J. Grantham; *Properties, Applications and Utilization of Latex, Including Treatment of Fabric with Latex,* C. F. Flint; *Chemistry and Physics of Raw Rubber and Rubber Derivatives, Gutta-Percha, Chicle, Balata and Jelutong,* W. J. S. Naunton; *Synthetic Rubber,* Maldwyn Jones; *Testing Equipment and Specifications Other Than for Latex,* W. J. S. Naunton; *Compounding Ingredients, Accelerators, Antioxidants and Softeners,* F. H. Cotton.

*Fibres and Textiles,* F. Chadwick; *Chemical and Physical Properties of Vulcanized Rubber,* A. E. T. Neale; *Tires,* J. G. MacKay; *Belting,* G. F. Payne; *Hose and Tubing,* J. Kirkwood; *Cables and Electrical Insulation,* H. A. Daynes; *Footwear,* R. C. Davies; *Games, Sport Accessories and Toys,* J. P. Griffiths; *Mechanical Rubber Goods,* Herbert Rogers; *Roads,* G. E. Coombs; *Flooring,* J. Kirkwood; *Surgical Goods,* C. R. Pinnell; *Textile-Rubber Composites, Solvents and Cements,* W. N. Lister; *Sponge Rubber,* J. D. Campbell; *Hard Rubber,* B. L. Davies; *Works Processes and Materials,* B. L. Davies; and *Machinery and Appliances,* E. Morris.

## BOOKLETS, CATALOGS, Etc.

**Chemical Industries. (14th Edition).** Edited by D. M. Newitt. Published by Leonard Hill, Ltd., 17 Stratford Place, W. 1, London, England. 8¾ x 11 in. 364 pp. (Available from Chemical Publishing Co., 148 Lafayette St., New York City, at $4.00 per copy).

Like previous numbers, this latest edition is designed to be of practical assistance to the chemist and technician in the factory. Edited solely from the British point of view, it is a comprehensive compilation of data and information essential to the conduct of the process industries, including lists of raw materials, machinery, equipment, etc.

The book is divided into nine sections: Materials of Construction, Power Plant, Chemical Plant, Handling, Instruments, Heavy Chemicals, Fine Chemicals, Tables, and Books. The use of tabs makes the location of each section a simple matter. In addition, an index to the complete subject matter of the book is included. In many respects, this book is similar in scope to the Buyer's Guidebook Number issued annually by *Chemical Industries,* the American chemical journal.

•

**Butyl Eight for Self-Curing Rubber Goods.** R. T. Vanderbilt Co., 230 Park Ave., New York City. 8½ x 11½ in. 16 pp.

Advantages of using Butyl Eight, one of the company's latest accelerators, are stressed in this booklet. Methods for incorporating the accelerator in various compounds, including naphtha cements, calendered articles, extruded goods, etc., are given. Aging of a white stock containing Butyl Eight and the retarding effect of rubber substitute on the accelerator are indicated by test results. Although issued last year, we believe this is the first review of the booklet to appear in the literature.

Scrap Rubber

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LATEX IN INDUSTRY
By Royce J. Noble, Ph.D.
Text Book on Latex. Price: $7.00

LATEX AND ITS INDUSTRIAL APPLICATIONS (Vol. I)
By Frederick Marchionna
Bibliography of latex patents and literature to June, 1932. Price: $15.00

LATEX AND RUBBER DERIVATIVES AND THEIR INDUSTRIAL APPLICATIONS (Vols. II & III)
By Frederick Marchionna
Bibliography of latex patents and literature from June, 1932 to January, 1937; rubber derivatives to January, 1937. Price: $20.00

(Combination Price, Vols. I, II and III: $30.00)

*Published by*

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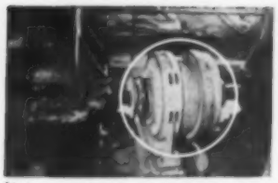

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## REVIEWS (CONT'D)

**The Application of Latex to Highway and Floor Surfacing.** (Communication 245). By W. G. Wren. Rubber Research Institute of Malaya, Kuala Lumpur, F.M.S. 6 x 9¾ in. 16 pp.

The work carried out in recent years by the author, associated with the London Advisory Committee for Rubber Research (Ceylon and Malaya), at the Imperial Institute on the development of latex mixtures for road and floor surfacing is summarized in this report. As a result of this work, a number of cement-latex compositions were developed and the most suitable selected for small scale trials. The results of these trials are given, particularly in respect to microscopic investigation, principles of compounding, methods of mixing, physical tests, comparisons with other flooring materials, and application.

•

**Rex-Weld and Rex-Tube Flexible Metal Hose.** (Catalog G-21). Chicago Metal Hose Corp., Maywood, Ill. 8½ x 11 in. 40 pp.

Technical data on the use of flexible metal hose for saturated steam and superheated steam, for the conveyance of liquids and chemicals, and for numerous special applications is given in this catalog. The two distinct types of tubing made by the company, *i.e.*, annular corrugation (Rex-Weld) and spiral wound (Rex-Tube), are treated with separately and comprehensively. A special section, in two colors, is devoted to interesting developments in flexible metal hose engineering.

•

**Micromax and Other L & N Pyrometers.** (Broadside N-33). Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia, Penna. 7¾ x 10½ in. (folded).

A special effort has been made to picture and describe briefly the complete line of industrial temperature instruments made by the company in this broadside. The result is a convenient "roadmap" folder which, when spread out on desk or table, shows at a glance the choice of equipment available for a given job, the important features embodied in each, and the specific publications to which to turn for further information. A discussion of the thermocouples, Rayotubes, Thermohms and optical-type temperature detectors available is also included.

•

**The Annual Report to Employees.** Policyholders Service Bureau, Metropolitan Life Insurance Co., One Madison Ave., New York City. 8½ x 11 in. 52 pp.

This is one of a number of studies issued by the Policyholders Service Bureau. It is a review of the annual reports to employees of 116 companies issued during 1939, and a comparison of these reports with those of 44 companies issued in 1938. Emphasis is put on the new ways that have been developed in presenting this material to employees. The reports of several rubber manufacturers are included in the analysis.

•

**Research.** Okonite Co., Passaic, N. J. 8½ x 11 in. 32 pp.

This booklet shows by means of photographs and the briefest kind of text how a new insulation or protective sheath is developed, put into production, and finally checked and tested in laboratory and proving ground at the plant of the Okonite Company. The use of excellent photographs and clear, concise text gives the reader an illuminating step-by-step understanding of the development.

•

**The American Line.** American Foundry Equipment Co., Mishawaka, Indiana. 8½ x 11 in. 12 pp.

A complete summary of the different models and sizes of the various equipment made by the company is given in this catalog, including its dust collectors, sandcutters, tumblasts, flasks and jackets, and shearing machines. Operating views of typical installations of some of these products in leading industrial plants are also shown.

**Highway Safety Digest.** Automotive Safety Foundation, Tower Building, Washington, D. C. 5½ x 7½ in. 72 pp

The elements of the co-ordinated, national highway safety program supported by the automotive industry through the Automotive Safety Foundation are described in this booklet, issued in the form of a pocket digest. Valuable hints for highway safety which may be effectively put into practice by villages, towns, cities, counties and states, are given by means of a series of short articles, each describing another form of precaution. A standard highway safety program for states is part of the booklet.

•

**Boiler and Tank Accessories.** (Catalog No. 10). Steel Improvement & Forge Co., 960 Addison Road, Cleveland, Ohio. 8½ x 11 in. 40 pp.

Said to be the first one to be devoted exclusively to the presentation of accessories for fired and unfired pressure vessels, this catalog presents the complete line of Diamond-S accessories for boiler and tanks made by the company. In addition to illustrations and descriptions of these accessories, the catalog also includes technical data, such as hydrostatic test pressure curves and their interpretations.

•

**Your Government and Mine.** General Atlas Carbon Co., 60 Wall St., New York City. 3 x 6 in. 24 pp.

A timely piece of literature, this little booklet contains biographical sketches and portraits of the presidents of the United States, presidential and congressional election statistics, data on the Supreme Court, important excerpts from the Constitution, the powers and duties of Congress and the President, and the "Bill of Rights." Some interesting questions and answers concerning the various presidents are also included.

•

**Wheelco Bulletin S2-2.** Wheelco Instruments Co., 1929 S. Halsted St., Chicago, Ill. 8½ x 11 in. 16 pp.

The company's extensive line of thermocouples, thermocouple wire, lead wire, insulators, protecting tubes, etc., is illustrated and described in this bulletin which supersedes No. 180-1. Several pages are devoted to recommendations for selecting thermocouples, lead wire and protecting tubes. A few of the company's temperature indicators and controllers are also illustrated.

•

**Webcell Continuous Dialyser.** Brosites Machine Co., 30 Church St., New York City. 5 x 8 in. 8 pp.

The construction and method of operation of the laboratory model Webcell Continuous Dialyser, suitable for the separation of colloidal material from colloidal dispersions, as well as for the recovery of soluble salts and the removal of acids, is given in this booklet. The model described is manufactured of a transparent plastic so that the entire operation can be readily observed.

•

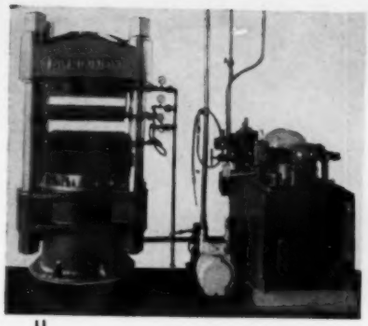
**Panel Instruments.** (Catalog 4120). Roller-Smith Co., Bethlehem, Penna. 8½ x 11 in. 8 pp.

The company's Panel Type 3-inch and 4-inch instruments are illustrated and described in this latest catalog. Instruments covered include ammeters, voltmeters, and single phase and polyphase wattmeters. Dimensions of the various types of instruments are also given.

•

**S-A Hand and Motor Winches.** (Bulletin 340). Stephens-Adamson Mfg. Co., Aurora, Ill. 8½ x 11 in. 4 pp.

This new folder covers the complete line of hand and motor winches, for lifting and pulling loads up to 3,000 pounds, featured by the company. Dimensions and specifications of the various styles are included. A few applications are illustrated.

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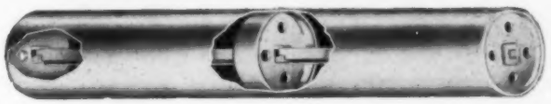

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# MARKETS

***Rubber – Crude, Reclaimed and Scrap – Cotton – Ducks – Tire Fabrics – Sheetings***

**NEW YORK, JULY 9, 1940**

## Crude Rubber

EXTREMELY sensitive to all influencing factors, the price for spot rubber on the Commodity Exchange has followed an erratic channel since our last report, with definite tendencies to move into lower positions in the past several days. High for the month was 23.25 on June 11 and low was 20.50 on July 3, a 2¾c variation. In mid-June commission house selling was fairly well balanced by trade and dealer buying, the loss recorded in one day being made up on the following day. This situation continued almost to the end of the month when uncertainty created by the proposed purchase of 150,000 tons of rubber by the United States for defense purposes broke the price to 21.25 on June 28. Announcement of the method by which this rubber would be imported, a few days later, served to lift the price somewhat, but a rather dull market has resulted. The course of prices in the next several weeks depends largely upon further European developments, particularly with respect to what decisions will be reached by the axis powers concerning colonial possessions in the Near East. Quotations in the outside market, Exchange, London and Singapore, follow:

As of July 9

***Plantations—***

| | | | |
|---|---|---|---|
| Ribbed Smoked Sheets— | | | |
| No. 1 Spot | — | @ | .21⅛ |
| September | — | @ | .20⅛ |
| October-December | — | @ | .19⅜ |
| No. 2 | — | @ | .20½ |
| No. 3 | — | @ | .20¼ |
| No. 4 | — | @ | .20 |
| Thin Latex Crepe | — | @ | .20½ |
| Thick Latex Crepe | — | @ | .20½ |
| Brown Crepe, No. 1 | — | @ | .20¾ |
| Brown Crepe, No. 2 | — | @ | .20 |
| Amber Crepe, No. 2 | — | @ | .20¼ |
| Amber Crepe, No. 3 | — | @ | .20 |
| Brown Crepe, Rolled | — | @ | .15½ |

***Latex—***

| | | | |
|---|---|---|---|
| Normal, per lb., carload lots | — | @ | .25¼ |

***Paras—***

| | | | |
|---|---|---|---|
| Up-River, fine | — | @ | .19⅞ |
| Acre Bolivian, fine | — | @ | .20 |

***Balata***

| | | | |
|---|---|---|---|
| Brazilian block | — | @ | .14 |

### LONDON MARKET

Standard Smoked Sheets—Buyers—July 9

| | | | |
|---|---|---|---|
| July | 12½ | @ | 12¾d |
| October-December | 11⅝ | @ | 11⅞d |

### SINGAPORE MARKET

Standard Smoked Sheets—Sellers—July 9

| | | | |
|---|---|---|---|
| July | — | @ | 10 3/32d |
| October-December | — | @ | 9 5/8d |

## Scrap Rubber

The scrap rubber market has been fairly steady the past few weeks, although there has been some adjustment in the price structure since our last report, prices increasing slightly on some grades and dropping slightly on others. Dealers do not expect the recent export restrictions to have any serious effect on the market. Current quotations follow:

(Prices to Consumers)

| | | | |
|---|---|---|---|
| Auto tire peelings, ton | 20.00 | @ | 21.00 |
| Mixed auto, ton | 13.50 | @ | 14.00 |
| Beadless tires, ton | 18.00 | @ | 19.00 |
| Clean solid truck tires, ton | 30.00 | @ | 32.50 |
| Boots and shoes, ton | 21.00 | @ | 22.00 |
| Arctics, untrimmed, ton | 18.00 | @ | 19.00 |
| Inner tubes, No. 1, lb. | .10 | @ | .11 |
| Inner tubes, No. 2, lb. | .04⅜ | @ | .05 |
| Inner tubes, Red, lb. | .04½ | @ | .04¾ |

## Reclaimed Rubber

Reclaimers report some uncertainty in the market, with the trade awaiting developments, particularly from abroad. The new export regulations have not affected the market as yet except to delay one or two large shipments to Canada. 15,719 long tons of reclaim were consumed in May, amounting to 30.5% of crude. There has been no change in the price structure since our last report. Current quotations follow:

***Shoe***

| | | | | |
|---|---|---|---|---|
| Unwashed, lb. | .06½ | @ | .06¾ |
| Washed, lb. | .10 | @ | .10¼ |

***Tube***

| | | | | |
|---|---|---|---|---|
| No. 2 (Compounded), lb. | .09 | @ | .10 |
| Red Tube, lb. | .09 | @ | .09¼ |

***Tires***

| | | | | |
|---|---|---|---|---|
| Black (acid process), lb. | .07 | @ | .07¼ |
| Black, selected tires, lb. | .06 | @ | .06¼ |
| Dark Gray, lb. | .09¼ | @ | .10 |
| White, lb. | .12½ | @ | .14 |
| Truck, Heavy Gravity, lb. | .05½ | @ | .06 |
| Truck, Light Gravity, lb. | .07 | @ | .07½ |

***Miscellaneous***

| | | | | |
|---|---|---|---|---|
| Mechanical blends, lb. | .04½ | @ | .05 |

## Tire Fabrics

(Prices Net at the Mill)

| | | | | |
|---|---|---|---|---|
| Peeler, carded, 23/5/3, lb. | .30½ | @ | .30¾ |
| Peeler, carded, 23/4/3, lb. | .31½ | @ | .31¾ |
| Peeler, carded, 15/3/3, lb. | .28½ | @ | .28¾ |
| Peeler, carded, 15/4/2, lb. | .28½ | @ | .28¾ |
| Peeler, carded, 13/3/3, lb. | .27½ | @ | .27¾ |

CHAFERS

| | | | | |
|---|---|---|---|---|
| Carded, American, 1 1/16", lb. | .30½ | @ | .31 |
| Carded, American, 1", lb. | .20 | @ | .26 |

## Cotton

Cotton prices have swung in a 68 point range since our last report. Despite the practically complete loss of European markets, occasioned by the spread of the war to the Mediterranean basin, the price moved upward in mid-June, largely because of active trading in the textile market and exceptionally large takings by domestic mills. Wall Street and commission houses also joined the buying forces, which helped to keep the price up. A surge of speculation on June 19 carried the price to 11.14, high for the period. Shortly thereafter, however, the price began to sag, with July liquidation featuring the trading, continuing a fairly steady downward movement until it reached 10.46 on July 5, low for the period. Still lower prices are anticipated for the balance of this month due to a number of unsatisfactory factors, including the fact that it is necessary to switch into new contracts this month. Quotations for middling uplands on the Exchange follow:

| | June 10* | July 9* | | |
|---|---|---|---|---|
| | Close | High | Low | Close |
| July | 9.83 | 9.85 | 9.85 | 9.80 |
| October | 8.66 | 9.40 | 9.33 | 9.33 |
| December | 8.57 | 9.24 | 9.18 | 9.18 |

(*) New contract.

## Sheetings

| | | | | | |
|---|---|---|---|---|---|
| 48x40 | 36 in. | 5.50 | lb. | — | @ .04 |
| 40x40 | 36 in. | 6.15 | lb. | — | @ .03⅝ |
| 40x36 | 36 in. | 6.50 | lb. | — | @ .03⅜ |
| 48x48 | 40 in. | 2.50 | lb. | — | @ .08 |
| 48x48 | 40 in. | 2.85 | lb. | — | @ .07 |
| 56x60 | 40 in. | 3.60 | lb. | — | @ .06¾ |
| 48x44 | 40 in. | 3.75 | lb. | — | @ .05¾ |

## Ducks

| | | | |
|---|---|---|---|
| Enameling (single filling), lb. | .22½ | @ | .25½ |
| Belting and Hose, lb. | .26¾ | @ | — |
| Single filling, A grade, lb. | .10¾ | @ | .11¾ |
| Double filling, lb. | .11¾ | @ | .12¾ |

## *Closing Rubber Prices on New York Commodity Exchange, Inc.*

*No. 1 Standard Contract of 10 Tons*

FROM JUNE 11 TO JULY 9

| Date | Spot | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | Sales |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| June 11 | 23.25 | 23.25 | 23.00 | 22.02 | 21.05 | 20.20 | 19.95 | 19.70 | 19.45 | 19.32 | 19.20 | 19.13 | 19.13 | 187 |
| 12 | 22.62 | 22.50 | 22.30 | 21.28 | 20.20 | 19.80 | 19.55 | 19.30 | 19.10 | 18.97 | 18.85 | 18.78 | 18.78 | 178 |
| 13 | 22.00 | 22.00 | 21.70 | 20.70 | 19.70 | 19.20 | 18.97 | 18.70 | 18.59 | 18.48 | 18.37 | 18.30 | 18.30 | 166 |
| 14 | 22.25 | 22.25 | 21.90 | 20.96 | 20.00 | 19.52 | 19.27 | 19.00 | 18.91 | 18.78 | 18.65 | 18.58 | 18.58 | 91 |
| 15 | 22.25 | 22.25 | 21.95 | 20.96 | 19.96 | 19.40 | 19.15 | 18.90 | 18.81 | 18.67 | 18.53 | 18.46 | 18.46 | 34 |
| 16 | | | | | | | | | | | | | | |
| 17 | 22.12 | 22.12 | 21.80 | 20.67 | 19.51 | 18.80 | 18.50 | 18.20 | 18.05 | 17.95 | 17.85 | 17.78 | 17.78 | 154 |
| 18 | 22.00 | 22.00 | 21.50 | 20.31 | 19.12 | 18.49 | 18.19 | 17.89 | 17.74 | 17.64 | 17.54 | 17.47 | 17.47 | 103 |
| 19 | 22.50 | 22.50 | 22.10 | 20.90 | 19.70 | 19.00 | 18.70 | 18.40 | 18.25 | 18.15 | 18.05 | 17.98 | 17.98 | 28 |
| 20 | 23.00 | 23.00 | 22.60 | 21.30 | 20.00 | 19.40 | 19.10 | 18.80 | 18.65 | 18.55 | 18.45 | 18.38 | 18.38 | 111 |
| 21 | 23.06 | 23.06 | 22.70 | 21.41 | 20.10 | 19.35 | 19.05 | 18.75 | 18.60 | 18.50 | 18.40 | 18.33 | 18.33 | 64 |
| 22 | 23.12 | 23.12 | 22.80 | 21.47 | 20.14 | 19.41 | 19.11 | 18.81 | 18.66 | 18.56 | 18.46 | 18.39 | 18.39 | 33 |
| 23 | | | | | | | | | | | | | | |
| 24 | 22.75 | 22.75 | 22.45 | 20.95 | 19.62 | 19.00 | 18.70 | 18.40 | 18.15 | 17.97 | 17.80 | 17.73 | 17.73 | 81 |
| 25 | 21.87 | 21.87 | 21.51 | 19.96 | 18.90 | 18.15 | 17.85 | 17.55 | 17.30 | 17.10 | 16.95 | 16.88 | 16.88 | 147 |
| 26 | 22.00 | —— | 21.60 | 20.05 | 19.25 | 18.50 | 18.25 | 18.00 | 17.70 | 17.52 | 17.35 | 17.28 | 17.28 | 244 |
| 27 | 22.00 | —— | 21.65 | 20.10 | 19.50 | 18.80 | 18.55 | 18.30 | 18.00 | 17.80 | 17.65 | 17.58 | 17.58 | 75 |
| 28 | 21.25 | —— | 20.90 | 19.86 | 18.81 | 18.21 | 17.96 | 17.71 | 17.46 | 17.37 | 17.27 | 17.20 | 17.20 | 151 |
| 29 | 21.50 | —— | 21.49 | 20.16 | 18.88 | 18.28 | 18.03 | 17.74 | 17.49 | 17.40 | 17.30 | 17.23 | 17.23 | 44 |
| 30 | | | | | | | | | | | | | | |
| July 1 | 21.50 | —— | 21.30 | 20.66 | 19.32 | 18.89 | 18.62 | 18.35 | 18.10 | 18.00 | 17.90 | 17.83 | 17.83 | 58 |
| 2 | 21.00 | —— | 21.15 | 20.20 | 19.15 | 18.74 | 18.47 | 18.20 | 17.95 | 17.85 | 17.75 | 17.68 | 17.68 | 51 |
| 3 | 20.50 | —— | 20.50 | 19.82 | 18.82 | 18.54 | 18.27 | 18.00 | 17.84 | 17.74 | 17.65 | 17.58 | 17.58 | 83 |
| 4 | | | | | | | | | | | | | | |
| 5 | 20.62 | —— | 20.56 | 20.04 | 19.04 | 18.55 | 18.34 | 18.13 | 17.88 | 17.78 | 17.68 | 17.61 | 17.61 | 27 |
| 6 | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | |
| 8 | 20.75 | —— | 20.70 | 20.11 | 19.11 | 18.60 | 18.45 | 18.30 | 18.20 | 18.12 | 18.05 | 17.98 | 17.98 | 56 |
| 9 | 20.75 | —— | 20.70 | 20.20 | 19.20 | 18.55 | 18.40 | 18.25 | 18.15 | 18.10 | 18.05 | 18.00 | 18.00 | 56 |

## Stamford Neophax Vulcanized Oil

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# CHEMICAL MARKETS

*New York, July 11, 1940*
*All Prices F.O.B. Works*

### ACCELERATORS

| | | | |
|---|---|---|---|
| **Organic** | | | |
| A-1 (Thiocarbanilid) | lb. | .24 @ | .30 |
| A-10 | lb. | .31 @ | .35 |
| A-11 | lb. | .52 @ | .65 |
| A-19 | lb. | .52 @ | .65 |
| A-32 | lb. | .70 @ | .80 |
| A-77 | lb. | .42 @ | .55 |
| A-100 | lb. | .42 @ | .55 |
| Aldehyde ammonia, crystals | lb. | .65 @ | .70 |
| Altax | lb. | .55 @ | .65 |
| Butyl Zimate | lb. | 2.50 @ | — |
| Captax | lb. | .50 @ | .37 |
| Crylene | lb. | .55 @ | .65 |
| Di-Ortho Tolyguanidine | lb. | .44 @ | .46 |
| Diphenylguanidine | lb. | .35 @ | .36 |
| El-Sixty | lb. | .50 @ | .65 |
| Ethyl Zimate | lb. | 2.50 @ | — |
| Ethylidene aniline | lb. | .42 @ | .43 |
| Formaldehyde aniline | lb. | .37½ @ | .42 |
| Guantal | lb. | .40 @ | .50 |
| Hepteen | lb. | .35 @ | .40 |
| Hexamethylenetetramine | lb. | .33 @ | — |
| Lead Oleate, No. 999 | lb. | .14 @ | — |
| Witco | | .15 @ | — |
| Monex | lb. | — @ | 2.35 |
| Phenex | lb. | .50 @ | .55 |
| Pip-Pip | lb. | 2.50 @ | — |
| Pipsolene | lb. | 1.55 @ | 1.85 |
| R & H 50-D | lb. | .42 @ | .43 |
| R-2 | lb. | 1.40 @ | 1.80 |
| R-2 Crystals | lb. | 2.50 @ | 2.75 |
| R-23 | lb. | .40 @ | — |
| RN-2 | lb. | 1.40 @ | 1.80 |
| RN-2 Crystals | lb. | 2.00 @ | 2.25 |
| Rotax | lb. | .60 @ | .65 |
| Safex | lb. | 1.20 @ | 1.30 |
| SPDX | lb. | .70 @ | .75 |
| Super-Sulphur No. 1 | lb. | .50 @ | — |
| No. 2 | lb. | .18 @ | .25 |
| Thiocarbanilid, drums | lb. | .24 @ | .30 |
| Thiurad | lb. | — @ | 2.35 |
| Trimene | lb. | .55 @ | .65 |
| base | lb. | 1.05 @ | 1.20 |
| Triphenylguanidine | lb. | .45 @ | — |
| Tuads | lb. | 2.35 @ | — |
| Ulto | lb. | 1.50 @ | 1.75 |
| Ureka | lb. | .60 @ | .75 |
| Ureka Blend B | lb. | .60 @ | .75 |
| Ureka C | lb. | .56 @ | .65 |
| Vulcanex | lb. | .42 @ | .43 |
| Vulcanol | lb. | .85 @ | — |
| Zimate | lb. | 2.35 @ | — |
| **Inorganic** | | | |
| Litharge, domestic | lb. | .07 @ | .07½ |
| Magnesia, calcined, heavy | lb. | .04 @ | — |

### COLORS

**Blacks (See Compounding Materials)**

| | | | |
|---|---|---|---|
| **Blues** | | | |
| Prussian | lb. | .36 @ | .37 |
| Ultramarine | lb. | .13 @ | — |
| **Browns** | | | |
| Mapico | lb. | .13 @ | — |
| Umber, Turkey | lb | .04 @ | .04½ |
| **Greens** | | | |
| Chrome | lb. | .21 @ | — |
| Guignet's Green | lb. | .70 @ | — |
| **Reds** | | | |
| Antimony | | | |
| crimson, 15/17 | lb. | .45 @ | — |
| sulfur, free | lb. | .48 @ | .60 |
| Indian English | lb. | .09 @ | .10 |
| Domestic (Maroon) | lb. | .11 @ | — |
| Red oxide, pure | lb. | .10 @ | .12 |
| Rub-Er-Red, f.o.b. Easton | lb. | .09¼ @ | — |
| **Whites** | | | |
| Cryptone, No. 19 | lb. | .05¼ @ | .05½ |
| Cryptone CB, No. 21 | lb. | .05¼ @ | .05½ |
| Cryptone, ZS-230 | lb. | .07½ @ | .07¾ |
| Cryptone, ZS-86 | lb. | .07½ @ | .07¾ |
| Lithopone | | | |
| Albalith, black label—11 | lb. | .03¾ @ | .04 |
| Azolith | lb. | .03¾ @ | .04 |
| Ray-bar | lb. | .05¼ @ | .05¾ |
| Ray-cal | lb. | .05¼ @ | .05¾ |
| Rayox | lb. | .13 @ | .14 |
| Titanox A | lb. | .13 @ | .14 |
| Titanox B | lb. | .05¼ @ | .05¾ |
| Titanox C | lb. | .05 @ | .05½ |
| **Zinc Oxide—American Process** | | | |
| American Azo: | | | |
| ZZZ (lead free) | lb. | .06¼ @ | .06½ |
| Anaconda, lead free | lb. | .06¾ @ | .06½ |
| Horsehead Lead Free Brand: | | | |
| Special—3 | lb. | .06¼ @ | .06½ |
| XX Red—4 | lb. | .06¼ @ | .06½ |
| XX Red—72 | lb. | .06¼ @ | .06½ |
| XX Red—78 | lb. | .06¼ @ | .06½ |
| XX Red—103 | lb. | .06¼ @ | .06½ |
| Kadox, black label—15 | lb. | .06½ @ | .06¾ |
| Blue label—16 | lb. | .06½ @ | .06¾ |
| Red label—17 | lb. | .06½ @ | .06¾ |
| St. Joe, black label | lb | .06¼ @ | .06½ |
| green label | lb. | .06¼ @ | .06½ |
| red label | lb. | .06¼ @ | .06½ |
| U. S. P.—7. bbls | lb. | .09½ @ | .09¾ |
| **Zinc Oxide—French Process** | | | |
| Florence White seal—7 bbls. | lb. | .08½ @ | .08¾ |
| Green seal—8 | lb. | .08 @ | .08¼ |
| Red seal—9 | lb. | .07½ @ | .07¾ |
| **Yellows** | | | |
| Cadmolith | lb. | .55 @ | .65 |
| Chrome | lb. | .14½ @ | .15½ |
| Mapico | lb. | .09½ @ | — |

### BLACKS
(In bags, carload lots)

| | | | |
|---|---|---|---|
| Aerfloted Arrow | lb. | .0265 @ | — |
| Certified | lb. | .0265 @ | — |
| Certified Spheron | lb. | .0265 @ | — |
| Continental | lb. | .0265 @ | — |
| Disperso | lb. | .0265 @ | — |
| Excello | lb. | .0265 @ | — |
| Fumonex | lb. | .03 @ | — |
| Fumonex Beads | lb. | .03 @ | — |
| Gastex | lb. | .03 @ | — |
| Kosmobile | lb. | .0265 @ | — |
| Kosmobile 66 | lb. | .0265 @ | — |
| Micronex (Amarillo) | lb. | .0265 @ | — |
| Micronex Beads (Amarilio) | lb. | .0265 @ | — |
| Pelletex | lb. | .03 @ | — |
| P-33 | lb. | .0475 @ | — |
| Supreme | lb. | .0265 @ | — |
| Thermax | lb. | .02 @ | — |
| Wyex | lb. | .0265 @ | — |

### COMPOUNDING MATERIALS

| | | | |
|---|---|---|---|
| Aluminum Flake | ton | 21.85 @ | 24.50 |
| Asbestine | ton | 13.00 @ | 15.00 |
| Barium carbonate (98-100%) | ton | — @ | — |
| Barytes | ton | 23.65 @ | 31.15 |
| Bentonite | lb. | .02 @ | .03 |
| Blanc fixe dry f.o.b. works | ton | 60.00 @ | 65.00 |
| Calcene | ton | 37.50 @ | 45.00 |
| Catalpo (fact.) | lb. | .02 @ | — |
| Chalk, precipitated | | | |
| Suprex white, extra lt | ton | 45.40 @ | 60.00 |
| heavy | ton | 45.00 @ | 55.00 |
| Clay, Aerfloted, Suprex | ton | 10.00 @ | 22.00 |
| Crown (f.o.b. plant) | ton | 10.00 @ | — |
| Dixie | ton | 10.00 @ | 24.50 |
| Langford | ton | — @ | 8.50 |
| McNamee | ton | 10.00 @ | 22.50 |
| Par | ton | 10.00 @ | 22.50 |
| Witco | ton | 10.00 @ | — |
| Cotton Flock (Dark) | lb. | .10½ @ | .13 |
| Kalite No. 1 | ton | 24.00 @ | 50.00 |
| Kalite No. 3 | ton | 34.00 @ | 60.00 |
| Kalvan | ton | 95.00 @ | 121.00 |
| Magnesium carbonate | lb. | .07½ @ | — |
| Mica | ton | 35.00 @ | 44.00 |
| Mineralite | ton | — @ | 30.00 |
| Pyrax A | ton | 6.00 @ | 20.00 |
| Rottenstone (powdered) | lb. | .02½ @ | .05 |
| Silene (calcium silicate) | lb. | .04 @ | .045 |
| Soapstone, powdered | ton | 16.00 @ | 22.00 |
| Starch, powdered | cwt. | 2.90 @ | 4.10 |
| Talc, domestic | ton | 25.00 @ | 45.00 |
| Whiting, commercial | ton | 17.00 @ | 18.00 |
| Columbia Filler | ton | 9.00 @ | 14.00 |
| English Cliffstone | ton | 33.00 @ | 43.00 |
| Witco | ton | 6.00 @ | — |
| Wood Flour | ton | 20.00 @ | 25.00 |
| Zinc Carbonate | lb. | — @ | — |
| Zinc Stearate | lb. | — @ | — |

### MINERAL RUBBER

| | | | |
|---|---|---|---|
| 285°-300° Mineral Rubber | ton | 23.00 @ | 42.00 |
| Black Diamond | ton | 25.00 @ | — |
| Genasco, solid (factory) | ton | 25.00 @ | 27.00 |
| Hard Hydrocarbon | ton | 23.00 @ | 42.00 |
| Parmr, solid | ton | 21.00 @ | 27.00 |
| Pioneer, MR. solid | ton | | |

### MISCELLANEOUS

| | | | |
|---|---|---|---|
| Aromatics—Rodo #0 | lb. | 3.50 @ | 4.00 |
| Rodo #10 | lb. | 4.50 @ | 5.00 |
| Curodex 19 | lb. | 2.75 @ | — |
| Curodex 188 | lb. | 3.50 @ | — |
| Curodex 198 | lb. | 4.50 @ | — |
| Para-Dor No. 5145 | lb. | 2.00 @ | — |
| Aresklene No. 375 (dispersing, wetting and penetrating agent) | lb. | .35 @ | .50 |
| Darvan (dispersing agent) | lb. | .30 @ | .47 |
| Santomerse S (dispersing, wetting, penetrating and stabilizing agent) | lb. | .11 @ | .25 |
| Sunproof | lb. | .22 @ | .27 |
| Sponge Paste | lb. | — @ | .18 |
| Tackol (tackifier) | lb. | .085 @ | .18 |
| Tonox | lb. | .52 @ | .61 |
| Ty-Ply R (and S) | gal. | 6.75 @ | 10.75 |
| Unicel (blowing agent) | lb. | .50 @ | — |

### SOFTENERS

| | | | |
|---|---|---|---|
| **Acids** | | | |
| Acetic, 28%, bbls | 100 lb. | 2.53 @ | 2.78 |
| Nitric, 36 degrees | cwt. | 5.00 @ | 6.00 |
| Sulfuric, 66 degrees | ton | 15.50 @ | 16.50 |
| **Acids, Fatty** | | | |
| Laurex | lb. | .10¾ @ | .13¼ |
| SL #10 | lb. | .12 @ | .14 |
| Stearex Beads | lb. | .08 @ | .09 |
| Stearic, double pressed | lb. | .12½ @ | .13½ |
| Stearite | lb. | .10½ @ | — |
| **Alkalies** | | | |
| Caustic Soda, 76% | cwt. | 2.70 @ | 3.55 |
| Soda Ash, 58%, C.L. | cwt. | — @ | 2.35 |
| **Oils** | | | |
| Cycline Oil | gal. | .14 @ | .20 |
| Degras, bbls | lb. | .07¾ @ | .08 |
| Fluxrite | lb. | .05½ @ | .06½ |
| Para-Flux | gal. | .17 @ | .18 |
| Para-Lube | lb. | .046 @ | .048 |
| Petrolatum, light | lb. | .03¾ @ | .03¾ |
| Pigmentaroil, tank cars | gal. | .16 @ | — |
| in drums | gal. | .22½ @ | .23½ |
| Pine, steam distilled | gal. | .64 @ | .69 |
| Rosin Oil, cmpd | gal. | .40 @ | — |
| Rubberol, f.o.b. Chicago | lb. | .13½ @ | .14 |
| Rubtack | lb. | .08 @ | .10 |
| Seedine, c.l. | lb. | .07¼ @ | — |
| Tackol | lb. | .08½ @ | .18 |
| Witco Palm Oil | lb. | .07 @ | — |
| Witco Softener No. 20 | gal. | .20 @ | — |
| Woburn No. 8, c.l. | lb. | .06 @ | — |
| **Resins and Pitches** | | | |
| Pitch, Burgundy | lb. | .05½ @ | .06½ |
| coal tar | ton | 19.00 @ | 22.00 |
| hardwood | ton | 16.00 @ | 22.50 |
| pine, 200 lb. gr. wt. | bbl. | 6.00 @ | 6.50 |
| Pigmentar, tank cars | gal. | .16 @ | — |
| in drums | gal. | .22½ @ | .23½ |
| R. S. L. Resin | | — @ | — |
| Retort Pine Tar, drums | ton | 20.00 @ | 26.00 |
| **Solvents** | | | |
| Acetone, pure | lb. | — @ | — |
| Benzene, 90% | gal. | .18 @ | .23 |
| Beta-Trichlorethane | gal. | — @ | .28 |
| Bondogen | lb. | .98 @ | 1.50 |
| Carbon, bisulfide | lb. | .05¼ @ | .09 |
| Carbon tetrachloride | gal. | .73 @ | 1.065 |
| Dichlorethylene | lb. | — @ | — |
| Dipentene, cml., drums | gal | .41 @ | .58 |
| Ethylene dichloride | lb. | .06 @ | .07 |
| Plastogen | lb. | .07¼ @ | .12 |
| Reogen (drums) | lb. | .11½ @ | .26 |
| Rub-Sol (f.o.b. Okla.) | gal. | .09 @ | — |
| Trichlorethylene | lb. | — @ | .08½ |
| Turpentine, spirits | gal. | .43 @ | .47 |
| dest. dist., drums | gal. | .33 @ | .41 |
| **Waxes** | | | |
| Beeswax, white | lb. | .39 @ | .45 |
| Carnauba, yellow | lb. | .46 @ | .47½ |
| Ceresin, white, dom | lb. | .08 @ | .11 |
| Montan, crude | lb. | .10¾ @ | .11¾ |
| **Paraffin (c.l.—f.o.b. N. Y.)** | | | |
| Yellow crude scale | lb. | .02¾ @ | — |
| Refined, 122/127 | lb. | .04½ @ | — |

### ANTI-OXIDANTS

| | | | |
|---|---|---|---|
| Agerite Alba | lb. | 1.50 @ | 1.95 |
| Exel | lb. | 1.00 @ | 1.40 |
| Gel | lb. | .57 @ | .73 |
| Hipar | lb. | .65 @ | .92 |
| Powder | lb. | .52 @ | .64 |
| Resin | lb. | .52 @ | .64 |
| Resin D | lb. | .52 @ | .64 |
| White | lb. | 1.25 @ | 1.60 |
| Albasan | lb. | .70 @ | .75 |
| Antox | lb. | — @ | .56 |
| B-L-E | lb. | .52 @ | .61 |
| Flectol B | lb. | .52 @ | .65 |
| Flectol H | lb. | .52 @ | .65 |
| Flectol White | lb. | .90 @ | 1.15 |
| Neozone | lb. | .52 @ | .63 |
| Oxynone | lb. | .64 @ | .80 |
| Retardex | lb. | .35 @ | .40 |
| Santoflex B | lb. | .52 @ | .65 |
| Santovar A | lb. | 1.15 @ | 1.40 |
| S.C.R. | lb. | .33 @ | .35 |
| Stabilite | lb. | .52 @ | .54 |
| Stabilite Alba | lb. | .70 @ | .75 |
| VGB | lb. | .52 @ | .61 |

### MOLD LUBRICANTS

| | | | |
|---|---|---|---|
| Areskiene | lb. | .35 @ | .50 |
| Cocoa Soapstock | lb. | .06 @ | .08 |
| Dipex | lb. | .06 @ | .08 |
| Lubrex | lb. | .25 @ | .30 |
| Mineralite | ton | — @ | 30.00 |
| Mold Paste | lb. | .12 @ | .18 |
| Rubberol, f.o.b. Chicago | lb. | .13½ @ | .14 |
| Sericite, f.o.b. N. Y. | ton | 65.00 @ | — |
| Soap Tree Bark, cut, sifted | lb. | .06 @ | .08 |

### FACTICE OR RUBBER SUBSTITUTES

| | | | |
|---|---|---|---|
| Amberex | lb. | .17 @ | — |
| Black | lb. | .08 @ | .12 |
| White | lb. | .08½ @ | .12 |
| Brown | lb. | .08 @ | .10½ |
| Neophax | lb. | .09¾ @ | — |

### VULCANIZING INGREDIENTS

| | | | |
|---|---|---|---|
| Dispersed Sulfur No. 2 | lb. | .07½ @ | .13 |
| Sulfur Chloride, yellow (drs.) | lb. | .04 @ | — |
| Sulfur flour, | | | |
| Refined, 100% pure (bags) | cwt. | 2.50 @ | 3.65 |
| Commercial (bags) | cwt. | 1.60 @ | 2.35 |
| Telloy | lb. | 1.75 @ | — |
| Vandex | lb. | 1.75 @ | — |

# STATISTICS

***Crude Rubber — Latex & Guayule — Reclaim — Tires & Tubes — Automobiles — Rims — Gasoline — Cotton Prices***

## U. S. Imports and Exports of Crude Rubber

| YEARS | Gross Imports: Long Tons | Gross Imports: Total Declared Value | Gross Imports: Average Declared Value per pound Cents | Re-exports: Long Tons | Re-exports: Total Declared Value | Re-exports: Average Declared Value per pound Cents | Net Imports: Long Tons |
|---|---|---|---|---|---|---|---|
| 1924 | 325,899 | 173,367,272 | 23.75 | 10,309 | 6,057,637 | 26.23 | 315,590 |
| 1925 | 393,370 | 426,167,504 | 48.36 | 14,827 | 19,847,753 | 59.76 | 378,543 |
| 1926 | 409,944 | 501,131,064 | 54.57 | 17,671 | 22,470,583 | 56.77 | 392,273 |
| 1927 | 424,733 | 338,688,492 | 35.60 | 27,775 | 24,735,488 | 39.76 | 396,958 |
| 1928 | 432,633 | 242,727,423 | 25.05 | 32,159 | 18,128,761 | 25.17 | 400,474 |
| 1929 | 560,082 | 239,177,811 | 19.06 | 36,485 | 16,868,718 | 20.64 | 523,597 |
| 1930 | 482,083 | 139,133,048 | 12.88 | 30,205 | 9,310,205 | 13.76 | 451,878 |
| 1931 | 497,176 | 72,922,845 | 6.55 | 25,595 | 4,255,572 | 7.42 | 471,581 |
| 1932 | 409,556 | 31,936,459 | 3.48 | 20,930 | 2,015,612 | 4.30 | 388,626 |
| 1933 | 407,817 | 44,034,064 | 4.82 | 20,537 | 2,601,352 | 5.65 | 387,280 |
| 1934 | 449,513 | 97,929,676 | 9.73 | 23,848 | 5,770,109 | 10.80 | 425,665 |
| 1935 | 453,134 | 115,299,448 | 11.36 | 11,389 | 3,084,331 | 12.09 | 441,745 |
| 1936 | 467,064 | 152,072,496 | 14.54 | 12,581 | 4,488,223 | 15.93 | 454,483 |
| 1937 | 574,600 | 237,307,041 | 18.44 | 7,902 | 3,385,433 | 19.02 | 566,698 |
| 1938 | 397,620 | 125,357,730 | 14.07 | 5,652 | 1,799,124 | 14.21 | 391,968 |
| 1939 | 469,803 | 167,558,245 | 15.92 | 13,125 | 5,832,618 | 19.84 | 456,678 |
| 1939: | | | | | | | |
| **Apr.** | **30,836** | **10,400,125** | **15.06** | **440** | **151,644** | **15.38** | **30,396** |
| **May** | **42,998** | **15,041,433** | **15.62** | **496** | **180,091** | **16.20** | **42,502** |
| **June** | **32,437** | **11,403,150** | **15.69** | **413** | **147,910** | **16.00** | **32,024** |
| July | 34,288 | 12,071,105 | 15.72 | 440 | 164,428 | 16.69 | 33,848 |
| Aug. | 35,794 | 12,702,958 | 15.84 | 267 | 89,741 | 15.01 | 35,527 |
| Sept. | 35,006 | 12,667,740 | 16.16 | 1,472 | 659,055 | 19.98 | 33,534 |
| Oct. | 42,784 | 15,211,621 | 15.87 | 5,886 | 2,881,172 | 21.85 | 36,898 |
| Nov. | 39,422 | 14,555,150 | 16.48 | 1,228 | 539,763 | 19.63 | 38,194 |
| Dec. | 68,384 | 25,861,354 | 16.88 | 1,116 | 529,759 | 21.20 | 67,268 |
| 1940: | | | | | | | |
| Jan. | 68,962 | 26,314,500 | 17.03 | 955 | 447,673 | 20.92 | 68,007 |
| Feb. | 40,603 | 15,578,517 | 17.13 | 1,291 | 599,819 | 20.74 | 39,312 |
| Mar. | 55,517 | 21,845,290 | 17.57 | 975 | 447,460 | 20.49 | 54,542 |
| April | 66,622 | 26,176,442 | 17.54 | 565 | 252,638 | 19.98 | 66,057 |
| May | 47,559 | 18,511,955 | 17.38 | 821 | 301,914 | 16.41 | 46,738 |

Note: "Gross Imports" do not include latex or guayule. To secure more accurate figures for "Net Imports" latex and guayule figures (shown below) should be added and the re-export figure deducted from the total. Annual figures for 1922, however, include both latex and guayule; guayule only is included in 1923. Annual figures for 1922-36 were revised in February, 1937.

## United States Imports of Guayule, Balata, Jelutong, Liquid Latex

*(All Quantities in Long Tons)*

| | Guayule Tons | Guayule Dollars | Balata Tons | Balata Dollars | Jelutong Tons | Jelutong Dollars | Liquid Latex (1) Tons | Liquid Latex (1) Dollars |
|---|---|---|---|---|---|---|---|---|
| 1924 | 1,356 | 536,392 | 464 | 568,456 | 6,165 | 1,237,100 | 2,157 | 864,059 |
| 1925 | 3,781 | 1,803,448 | 517 | 574,750 | 6,749 | 1,642,531 | 3,272 | 3,537,510 |
| 1926 | 4,305 | 2,562,096 | 354 | 327,213 | 7,263 | 3,127,757 | 3,394 | 4,686,743 |
| 1927 | 5,018 | 2,674,957 | 582 | 477,246 | 7,785 | 2,448,657 | 1,495 | 1,170,650 |
| 1928 | 3,077 | 1,755,685 | 731 | 430,855 | 7,552 | 2,540,059 | 4,007 | 2,121,786 |
| 1929 | 1,275 | 545,175 | 728 | 566,964 | 8,204 | 2,458,126 | 3,729 | 1,788,391 |
| 1930 | 1,096 | 347,388 | 502 | 422,684 | 5,907 | 1,403,244 | 4,458 | 1,508,786 |
| 1931 | .... | ..... | 1,207 | 411,380 | 5,777 | 1,019,010 | 4,675 | 888,909 |
| 1932 | .... | ..... | 707 | 147,403 | 4,607 | 616,596 | 5,112 | 601,999 |
| 1933 | .... | ..... | 1,659 | 2,261,869 | 5,990 | 944,895 | 11,085 | 1,833,671 |
| 1934 | 398 | 75,349 | 1,054 | 438,209 | 4,987 | 943,752 | 13,107 | 3,643,221 |
| 1935 | 459 | 86,835 | 615 | 188,384 | 5,644 | 1,063,126 | 13,553 | 3,782,222 |
| 1936 | 1,229 | 286,552 | 535 | 199,368 | 6,163 | 1,296,364 | 19,852 | 6,659,899 |
| 1937 | 2,694 | 745,873 | 354 | 151,344 | 7,109 | 2,017,786 | 23,185 | 10,213,670 |
| 1938 | 2,485 | 623,819 | 509 | 181,140 | 9,132 | 2,944,504 | 11,878 | 4,147,318 |
| 1939 | 2,232 | 463,345 | 694 | 265,553 | 6,640 | 1,603,418 | 27,438 | 10,467,552 |
| 1939: | | | | | | | | |
| **Apr.** | **180** | **24,584** | **59** | **18,170** | **281** | **72,024** | **1,018** | **360,739** |
| **May** | **102** | **22,347** | **56** | **16,359** | **645** | **161,745** | **2,786** | **1,067,682** |
| **June** | **91** | **19,879** | **119** | **33,876** | **597** | **122,087** | **1,836** | **694,863** |
| July | 150 | 32,626 | 39 | 18,813 | 663 | 141,540 | 2,934 | 1,064,927 |
| Aug. | 178 | 38,687 | 28 | 8,689 | 742 | 208,156 | 2,614 | 1,001,013 |
| Sept. | 133 | 30,091 | 36 | 19,682 | 479 | 100,285 | 2,525 | 965,615 |
| Oct. | 282 | 61,376 | 107 | 43,267 | 465 | 127,084 | 2,555 | 968,207 |
| Nov. | 214 | 46,558 | 96 | 37,858 | 289 | 74,358 | 3,071 | 1,227,788 |
| Dec. | 236 | 51,521 | 64 | 38,781 | 477 | 126,548 | 2,779 | 1,127,924 |
| 1940: | | | | | | | | |
| Jan. | 128 | 27,901 | 34 | 19,478 | 612 | 155,570 | 3,410 | 1,412,728 |
| Feb. | 314 | 70,251 | 55 | 26,420 | 461 | 134,878 | 2,171 | 947,524 |
| Mar. | 365 | 81,181 | 45 | 20,895 | 542 | 162,493 | 3,376 | 1,473,056 |
| April | 314 | 65,313 | 50 | 18,289 | 506 | 176,064 | 3,763 | 1,608,156 |
| May | 289 | 57,578 | 60 | 20,503 | 495 | 158,713 | 3,584 | 1,523,879 |

(1) Weight given in pounds of dry rubber contained in latex.
Note: Annual figures for 1924-1936 revised on basis of information received on February 8, 1937.

## U. S. Consumption of Crude Rubber

**Figures on Monthly Basis**

| | 1933 | 1934 | 1935 | 1936 | 1937 | 1938 | 1939 | 1940 |
|---|---|---|---|---|---|---|---|---|
| Jan. | 22,645 | 39,190 | 46,636 | 48,631 | 50,879 | 31,265 | 47,387 | 54,978 |
| Feb. | 21,392 | 40,515 | 42,720 | 36,841 | 51,950 | 25,357 | 43,422 | 49,832 |
| Mar. | 17,843 | 47,003 | 42,153 | 42,813 | 54,129 | 32,389 | 51,416 | 50,192 |
| Apr. | 25,928 | 44,853 | 44,247 | 52,031 | 51,859 | 29,730 | 45,268 | 50,103 |
| May | 44,074 | 42,918 | 41,101 | 50,612 | 51,795 | 30,753 | 45,484 | 51,619 |
| June | 50,743 | 40,147 | 36,156 | 52,772 | 51,860 | 32,540 | 48,438 | ..... |
| July | 49,614 | 32,553 | 35,917 | 48,250 | 43,703 | 34,219 | 44,975 | ..... |
| Aug. | 44,428 | 33,216 | 38,775 | 46,777 | 41,506 | 40,552 | 51,740 | ..... |
| Sept. | 35,281 | 30,258 | 37,086 | 46,449 | 43,945 | 40,183 | 51,402 | ..... |
| Oct. | 31,543 | 31,253 | 41,969 | 49,637 | 38,754 | 42,850 | 57,155 | ..... |
| Nov. | 28,831 | 34,748 | 42,310 | 50,433 | 34,025 | 49,050 | 55,677 | ..... |
| Dec. | 28,757 | 36,569 | 42,474 | 49,754 | 29,195 | 48,143 | 49,636 | ..... |
| Tot. | 401,079 | 453,223 | 491,544 | 575,000 | 543,600 | 437,031 | 592,000 | ..... |

Note: The above figures are based on the annual surveys conducted by the Leather and Rubber Division, Bureau of Foreign & Domestic Commerce, Washington, D. C., with the exception of those for the current year which are estimates made by the Rubber Manufacturers Association. They are revised frequently and the latest available issue should always be consulted for the most reliable figures.

## Reclaimed Rubber in the United States

*(All Quantities in Long Tons)*

| Year | Production | Consumption Tons | Consumption % to Crude | Stocks | Year | Production | Consumption Tons | Consumption % to Crude | Stocks |
|---|---|---|---|---|---|---|---|---|---|
| 1930 | 157,968 | 153,500 | 40.9 | 22,000 | 1935 | 122,948 | 117,523 | 23.9 | 17,000 |
| 1931 | 129,690 | 123,000 | 35.1 | 21,714 | 1936 | 150,571 | 141,486 | 24.6 | 19,000 |
| 1932 | 75,656 | 77,500 | 23.3 | 16,334 | 1937 | 185,033 | 162,000 | 29.8 | 28,800 |
| 1933 | 93,587 | 85,000 | 21.2 | 17,780 | 1938 | 122,400 | 120,800 | 29.9 | 23,000 |
| 1934 | 108,162 | 100,855 | 22.3 | 20,000 | 1939 | 186,000 | 170,000 | 28.7 | 25,250 |

**Figures on Monthly Basis**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1939 | | | | | | | | | |
| Jan. | 13,870 | 12,633 | 26.7 | 22,350 | July | 11,777 | 12,448 | 27.7 | 21,269 |
| Feb. | 13,193 | 12,269 | 28.3 | 22,644 | Aug. | 16,461 | 15,485 | 29.9 | 21,402 |
| Mar. | 14,638 | 14,888 | 29.0 | 21,638 | Sep. | 16,830 | 15,583 | 30.3 | 21,384 |
| Apr. | 13,591 | 12,309 | 27.2 | 22,172 | Oct. | 19,549 | 17,423 | 30.5 | 21,694 |
| May | 13,817 | 12,425 | 27.3 | 22,556 | Nov. | 19,417 | 16,551 | 29.7 | 23,239 |
| June | 14,848 | 13,669 | 28.2 | 22,976 | Dec. | 18,009 | 14,317 | 28.8 | 25,250 |
| 1940: | | | | | | | | | |
| Jan. | 19,297 | 16,070 | 29.2 | 27,418 | July | ..... | ..... | ... | ..... |
| Feb. | 17,992 | 15,370 | 30.8 | 28,603 | Aug. | ..... | ..... | ... | ..... |
| Mar. | 17,234 | 15,931 | 31.7 | 28,488 | Sep. | ..... | ..... | ... | ..... |
| Apr. | 16,568 | 16,298 | 32.5 | 27,558 | Oct. | ..... | ..... | ... | ..... |
| May | 17,552 | 15,719 | 30.5 | 28,397 | Nov. | ..... | ..... | ... | ..... |
| June | ..... | ..... | ... | ..... | Dec. | ..... | ..... | ... | ..... |

Note: The above figures are based on the annual surveys conducted by the Leather and Rubber Division, Bureau of Foreign & Domestic Commerce, Washington, D. C., with the exception of those for the current year which are estimates made by the Rubber Manufacturers Association. They are revised frequently and the latest available issue should always be consulted for the most reliable figures. The annual figures are more accurate. Stocks shown are those on hand at the end of the indicated month or year.

## U. S. Consumption of Gasoline

*(Bureau of Mines Statistics)*
*(In Thousands of Barrels of 42 Gallons)*

| | 1938 | 1939 | 1940 | | 1938 | 1939 | 1940 |
|---|---|---|---|---|---|---|---|
| January | 35,323 | 37,767* | 40,370 | August | 50,549 | 53,828* | ..... |
| February | 31,981 | 34,595 | 37,557 | September | 46,150 | 49,347 | ..... |
| March | 41,409 | 42,520 | 44,607 | October | 46,365 | 49,687 | ..... |
| April | 43,430 | 43,977 | 47,683 | November | 45,084 | 47,275 | ..... |
| May | 44,937 | 49,547 | 52,946 | December | 41,742 | 43,694 | ..... |
| June | 48,383 | 49,812 | ..... | | | | |
| July | 47,650 | 50,508 | ..... | Total | 523,003 | 552,557* | ..... |

* Revised.

## Rims Inspected and Passed in U. S.

*(Tire and Rim Association Reports)*

| | Total | | Total | | Total |
|---|---|---|---|---|---|
| 1928 ..... | 24,247,282 | 1932 ..... | 6,261,336 | 1936 ..... | 20,790,192 |
| 1929 ..... | 24,141,507 | 1933 ..... | 8,713,962 | 1937 ..... | 22,237,964 |
| 1930 ..... | 17,364,096 | 1934 ..... | 12,255,118 | 1938 ..... | 10,612,138 |
| 1931 ..... | 11,253,800 | 1935 ..... | 18,664,356 | 1939 ..... | 17,471,914 |

| 1940 | | 1940 | | 1940 | |
|---|---|---|---|---|---|
| January ... | 2,163,914 | May ..... | 1,743,786 | September .. | ..... |
| February .. | 1,850,383 | June ..... | 1,266,300 | October ... | ..... |
| March ..... | 1,918,241 | July ..... | ..... | November .. | ..... |
| April ..... | 1,822,686 | August .... | ..... | December .. | ..... .. |

ADVERTISING PAGES REMOVED

## Daily Spot Closing Prices of Ribbed Smoked Sheet Rubber—*New York Market, in Cents per Pound*

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | Avc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1938 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| April | 10 7/8 | 11 7/8 | | 11 5/8 | 11 | 11 5/8 | 11 5/8 | 11 7/8 | 11 7/8 | | 11 5/8 | | 12 3/4 | 12 5/8 | | | 12 3/4 | 12 3/4 | 12 3/4 | 12 3/4 | 12 3/4 | | 12 3/4 | | 12 5/8 | 11 3/4 | 11 7/8 | 11 7/8 | 11 3/4 | 11 3/4 | | 11 7/8 |
| May | | 11 3/4 | 11 5/8 | 11 5/8 | 11 3/4 | 11 7/8 | 11 7/8 | 11 7/8 | 11 3/4 | 12 | 12 | 12 | 12 | 11 7/8 | | 11 7/8 | 12 3/4 | 11 7/8 | 12 | 12 1/8 | 12 1/8 | 12 3/4 | 12 3/4 | 11 7/8 | 11 3/4 | 11 5/8 | 11 3/4 | 11 7/8 | 11 7/8 | 11 3/4 | 11 3/4 | 11 7/8 |
| June | | 11 3/4 | 11 5/8 | | 11 3/4 | 11 7/8 | 11 7/8 | 11 7/8 | 11 3/4 | | 12 | 12 | 12 1/8 | 12 | | 12 1/8 | 12 3/4 | 12 | 12 1/8 | 12 1/8 | 12 1/8 | 12 3/4 | 12 3/4 | 12 | 12 1/8 | 12 1/8 | 12 1/8 | 12 | 12 | 12 1/8 | 12 1/8 | 12 |
| July | 15 3/4 | | | | 14 3/4 | 15 7/8 | 15 7/8 | 15 3/4 | | 12 | 14 3/4 | 15 1/8 | 15 1/8 | 14 7/8 | 12 1/2 | 15 3/4 | 15 3/4 | 15 1/8 | 15 1/8 | 15 1/8 | 15 1/8 | 15 3/4 | 15 3/4 | 13 3/4 | 13 3/4 | 15 | 15 1/8 | 14 3/4 | 14 3/4 | 14 3/4 | 14 3/4 | | 15 3/4 |
| August | 15 7/8 | 15 1/8 | 15 1/8 | 15 1/8 | 16 | 16 1/8 | 16 1/8 | 15 3/4 | 15 3/4 | 15 1/8 | 15 1/8 | 15 1/8 | 16 1/8 | 16 1/8 | 15 3/4 | 15 3/4 | 15 3/4 | 15 3/4 | 15 3/4 | 16 1/8 | 16 1/8 | 16 1/8 | 15 3/4 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 |
| Sept. | 16 1/8 | 16 1/4 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 |
| Oct. | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 |
| Nov. | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 |
| Dec. | 15 7/8 | 15 1/8 | 15 1/8 | | 15 1/8 | 15 7/8 | 16 1/8 | 15 7/8 | 15 1/8 | 16 | | 15 1/8 | 15 7/8 | 16 | | 16 | 16 1/8 | 15 7/8 | 16 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | | 15 1/8 | 15 1/8 | 16 1/8 | 15 1/8 | 16 1/8 | 16 1/8 | 16 | 16 1/8 |
| 1939 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Jan. | 15 3/4 | 15 3/4 | 16 1/8 | 16 1/8 | | 16 | 16 | 15 7/8 | 15 1/8 | 16 | 15 1/8 | 15 7/8 | 15 1/8 | 15 7/8 | | 15 7/8 | 15 3/4 | 15 1/8 | 15 3/4 | 15 7/8 | 15 3/4 | | 15 7/8 | 15 3/4 | 15 3/4 | 15 3/4 | 15 3/4 | | | 15 3/4 | 15 3/4 |
| Feb. | 15 3/4 | 15 3/4 | 15 3/4 | | | 15 1/8 | 15 1/8 | 15 7/8 | 15 3/4 | 15 3/4 | 15 1/2 | 15 7/8 | 15 1/8 | 16 | 16 1/4 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 15 3/4 | 16 | 16 | 16 |
| March | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 |
| April | 15 7/8 | 15 7/8 | 16 | 15 7/8 | 15 7/8 | 15 7/8 | 15 7/8 | 15 7/8 | 15 7/8 | 15 7/8 | 15 7/8 | 15 7/8 | 15 7/8 | 15 7/8 | 15 7/8 | 15 7/8 | 15 7/8 | 15 7/8 | 15 7/8 | 15 7/8 | 15 7/8 | 15 7/8 | 15 7/8 | 15 7/8 | 15 7/8 | 15 7/8 | 15 7/8 | 15 7/8 | 15 7/8 | 15 7/8 | 15 7/8 | 15 7/8 |
| May | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 |
| June | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 |
| July | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 |
| August | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 |
| September | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 |
| October | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 |
| November | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 |
| December | 15 7/8 | 15 1/8 | 15 1/8 | | 15 1/8 | 15 7/8 | 16 1/8 | 15 7/8 | 15 1/8 | 16 | | 15 1/8 | 15 7/8 | 16 | | 16 | 16 1/8 | 15 7/8 | 16 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | 16 1/8 | | 15 1/8 | 15 1/8 | 16 1/8 | 15 1/8 | 16 1/8 | 16 1/8 | 16 | 16 1/8 |
| 1940 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| January | 19 1/8 | 19 1/8 | 19 1/8 | 19 1/8 | 19 1/8 | 19 1/8 | 19 1/8 | 19 3/8 | 19 1/8 | 19 3/8 | 19 1/2 | 19 1/8 | 19 1/8 | 19 1/8 | 19 1/8 | 19 1/8 | 19 1/8 | 19 1/8 | 19 1/8 | 19 1/8 | 19 1/8 | 19 1/8 | 19 1/8 | 19 1/8 | 19 1/8 | 19 1/8 | 19 1/8 | 19 1/8 | 19 1/8 | 19 1/8 | 19 1/8 | 19 |
| February | 18 3/4 | 18 3/4 | 18 3/4 | 18 3/4 | 18 3/4 | 18 3/4 | 18 3/4 | 19 1/8 | 18 1/8 | 18 1/8 | 18 1/8 | 18 1/8 | 18 1/8 | 18 1/8 | 18 1/8 | 18 1/8 | 18 1/8 | 18 1/8 | 18 1/8 | 18 1/8 | 18 1/8 | 18 1/8 | 18 1/8 | 18 1/8 | 18 1/8 | 18 1/8 | 18 1/8 | 18 1/8 | 18 1/8 | 18 1/8 | 18 1/8 | 18 7/8 |
| March | 18 3/4 | 18 3/4 | 18 3/4 | 18 3/4 | 18 3/4 | 18 3/4 | 18 3/4 | 18 1/8 | 18 1/8 | 18 1/8 | 18 1/8 | 18 1/8 | 18 1/8 | 18 1/8 | 18 1/8 | 18 1/8 | 18 1/8 | 18 1/8 | 18 1/8 | 18 1/8 | 18 1/8 | 18 1/8 | 18 1/8 | 18 1/8 | 18 1/8 | 18 1/8 | 18 1/8 | 18 1/8 | 18 1/8 | 18 1/8 | 18 1/8 | 18 3/4 |
| April | 18 1/2 | 18 1/2 | 18 1/2 | 18 3/4 | 18 3/4 | 18 3/4 | 18 3/4 | 18 3/4 | 19 | 19 | 18 3/4 | 18 3/4 | 18 3/4 | 18 3/4 | 18 3/4 | 18 3/4 | 18 3/4 | 18 3/4 | 18 3/4 | 18 3/4 | 18 3/4 | 18 3/4 | 18 3/4 | 18 3/4 | 18 3/4 | 18 3/4 | 18 3/4 | 18 3/4 | 18 3/4 | 18 3/4 | 18 3/4 | 19 1/2 |
| May | 19 3/4 | 19 3/4 | 19 1/2 | 20 1/8 | 20 1/2 | 20 1/2 | 20 1/2 | 20 3/4 | 20 3/4 | 20 3/4 | 20 3/4 | 20 3/4 | 20 3/4 | 20 3/4 | 20 3/4 | 20 3/4 | 20 3/4 | 20 3/4 | 20 3/4 | 20 3/4 | 20 3/4 | 20 3/4 | 20 3/4 | 20 3/4 | 20 3/4 | 20 3/4 | 20 3/4 | 20 3/4 | 20 3/4 | 20 3/4 | 20 3/4 | 20 3/4 |
| June | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 |
| July | 21 1/2 | 21 1/2 | 20 1/2 | 21 1/2 | 21 1/2 | 20 1/2 | 21 1/2 | 21 3/4 | 21 3/4 | 20 3/4 | 20 3/4 | 20 3/4 | 20 3/4 | 20 3/4 | 20 3/4 | 20 3/4 | 20 3/4 | 20 3/4 | 20 3/4 | 20 3/4 | 20 3/4 | 20 3/4 | 20 3/4 | 20 3/4 | 20 3/4 | 20 3/4 | 20 3/4 | 20 3/4 | 20 3/4 | 20 3/4 | 20 3/4 | 20 3/4 | 20 3/4 |

## Average Spot Closing Prices—Ribbed Smoked Sheets

*(New York Markets)*

### Average Price per Pound for Years 1913-1932

| Year | Cents | Year | Cents | Year | Cents | Year | Cents | Year | Cents |
|---|---|---|---|---|---|---|---|---|---|
| 1913 | 82.04 | 1917 | 72.23 | 1921 | 16.36 | 1925 | 72.46 | 1929 | 20.59 |
| 1914 | 65.33 | 1918 | 60.15 | 1922 | 17.50 | 1926 | 48.50 | 1930 | 11.98 |
| 1915 | 65.85 | 1919 | 48.70 | 1923 | 29.45 | 1927 | 37.72 | 1931 | 6.17 |
| 1916 | 72.50 | 1920 | 36.30 | 1924 | 26.20 | 1928 | 22.48 | 1932 | 3.49 |

### Average Monthly Price per Pound Since 1933

| | 1933 Cents | 1934 Cents | 1935 Cents | 1936 Cents | 1937 Cents | 1938 Cents | 1939 Cents | 1940 Cents |
|---|---|---|---|---|---|---|---|---|
| Jan. | 3.08 | 9.32 | 13.10 | 14.35 | 21.37 | 14.63 | 15.75 | 19.06 |
| Feb. | 2.95 | 10.45 | 12.92 | 15.48 | 21.33 | 14.71 | 15.93 | 18.83 |
| Mar. | 3.01 | 11.01 | 11.51 | 15.89 | 24.09 | 13.55 | 16.26 | 18.58 |
| Apr. | 3.56 | 12.10 | 11.55 | 15.98 | 23.44 | 11.84 | 15.87 | 19.16 |
| May | 4.95 | 13.26 | 12.05 | 15.62 | 21.14 | 11.57 | 16.07 | 21.21 |
| June | 6.15 | 13.51 | 12.57 | 15.85 | 19.29 | 12.57 | 16.37 | 22.20 |
| July | 8.01 | 14.60 | 12.10 | 16.49 | 18.86 | 15.37 | 16.51 | |
| Aug. | 7.31 | 15.47 | 11.98 | 16.25 | 18.37 | 16.08 | 16.67 | |
| Sept. | 7.30 | 15.36 | 11.55 | 16.46 | 18.55 | 16.15 | 21.24 | |
| Oct. | 7.64 | 13.96 | 12.62 | 16.55 | 16.28 | 16.89 | 19.89 | |
| Nov. | 8.66 | 13.04 | 13.15 | 17.97 | 14.60 | 16.24 | 20.21 | |
| Dec. | 8.87 | 12.98 | 13.28 | 20.01 | 15.41 | 16.05 | 20.01 | |
| Average for Year | 5.96 | 12.92 | 12.37 | 16.41 | 19.39 | 14.64 | 17.57 | |

## London Closing Prices of Ribbed Smoked Sheets

*(In Pence Per Pound)*

| Day | 1940 Apr. | 1940 May | 1940 June | 1940 July | Day | 1940 Apr. | 1940 May | 1940 June | 1940 July |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 11 1/16 | 11 | | 12 7/8 | 17 | 11 | 11 15/16 | 14 1/4 | |
| 2 | 11 1/8 | 11 1/16 | | 13 | 18 | 11 | | | |
| 3 | 11 | 11 1/4 | 12 1/16 | 12 7/8 | 19 | 11 | | | |
| 4 | 10 13/16 | | 12 1/8 | 12 1/2 | 20 | | 11 3/4 | | |
| 5 | 10 15/16 | | 12 1/4 | 12 1/2 | 21 | | 11 13/16 | | |
| 6 | | 11 1/16 | 12 1/4 | | 22 | 10 1/2 | 11 7/8 | | |
| 7 | | 11 3/8 | 12 3/8 | | 23 | 11 | 11 7/8 | | |
| 8 | 10 1/2 | 11 1/2 | | 12 1/2 | 24 | 10 1/2 | 11 1/2 | | |
| 9 | 11 1/8 | 11 1/2 | | 12 1/2 | 25 | 10 15/16 | | | |
| 10 | 11 1/8 | 12 1/16 | 12 5/8 | | 26 | 10 1/2 | | | |
| 11 | 11 | | 13 1/8 | | 27 | | 11 7/8 | | |
| 12 | 11 | | 13 3/8 | | 28 | | 11 7/8 | | |
| 13 | | 11 7/8 | 13 7/8 | | 29 | 10 7/8 | 11 5/8 | | |
| 14 | | 11 15/16 | 13 15/16 | | 30 | 10 7/8 | 11 7/8 | | |
| 15 | 10 15/16 | 11 7/8 | | | 31 | | 11 15/16 | | |
| 16 | 10 15/16 | 11 15/16 | | | | | | | |

### Average Monthly Price Per Pound

| Month | 1937 Pence | 1938 Pence | 1939 Pence | 1940 Pence | Month | 1937 Pence | 1938 Pence | 1939 Pence | 1940 Pence |
|---|---|---|---|---|---|---|---|---|---|
| Jan. | 10.378 | 7.077 | 7.926 | 11.793 | Aug. | 8.830 | 7.841 | 8.545 | |
| Feb. | 10.503 | 7.029 | 7.942 | 12.577 | Sept. | 8.935 | 7.918 | 9.634 | |
| Mar. | 11.766 | 6.590 | 8.120 | 11.651 | Oct. | 7.855 | 8.355 | 10.177 | |
| Apr. | 11.471 | 5.793 | 7.910 | 10.980 | Nov. | 7.080 | 8.111 | 11.210 | |
| May | 10.250 | 5.632 | 8.002 | 11.600 | Dec. | 7.332 | 8.005 | 11.559 | |
| June | 9.548 | 6.147 | 8.216 | 13.046 | Average for Year | 9.424 | 7.164 | 8.959 | |
| July | 9.136 | 7.464 | 8.271 | | | | | | |

Note: No quotations were made in the London market from June 17 through June 30. Accordingly, the average for the month is based on the first eleven trading days only.

## Spot Closing Cotton Prices

*(Middling Upland Grade—New York Market)*

### Recent Daily Price Per Pound

| Date | 1940 May | 1940 June | 1940 July | Date | 1940 May | 1940 June | 1940 July | Date | 1940 May | 1940 June | 1940 July |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 10.96 | 10.21 | 10.69 | 11 | 10.45 | 10.65 | | 22 | 9.96 | 11.02 | |
| 2 | 10.93 | —— | 10.63 | 12 | —— | 10.85 | | 23 | 9.99 | —— | |
| 3 | 10.86 | 10.12 | 10.70 | 13 | 10.48 | 10.86 | | 24 | 10.37 | 11.04 | |
| 4 | 10.84 | 10.13 | —— | 14 | 9.98 | 11.01 | | 25 | 10.41 | 10.82 | |
| 5 | —— | 10.18 | 10.46 | 15 | 9.75 | 11.11 | | 26 | —— | 10.96 | |
| 6 | 10.74 | 10.31 | 10.71 | 16 | 9.86 | —— | | 27 | 10.68 | 10.93 | |
| 7 | 10.69 | 10.56 | —— | 17 | 9.72 | 10.89 | | 28 | 10.39 | 10.85 | |
| 8 | 10.67 | 10.43 | 10.60 | 18 | 9.46 | 11.03 | | 29 | 10.43 | 10.73 | |
| 9 | 10.73 | —— | 10.48 | 19 | —— | 11.14 | | 30 | —— | —— | |
| 10 | 10.32 | 10.42 | | 20 | 9.91 | 10.87 | | 31 | 10.21 | —— | |
| | | | | 21 | 9.76 | 10.93 | | | | | |

### Average Monthly Price Per Pound

| | 1937 Cents | 1938 Cents | 1939 Cents | 1940 Cents | | 1937 Cents | 1938 Cents | 1939 Cents | 1940 Cents |
|---|---|---|---|---|---|---|---|---|---|
| Jan. | 13.06 | 8.57 | 8.94 | 11.19 | Aug. | 10.41 | 8.41 | 9.30 | |
| Feb. | 13.15 | 8.91 | 8.97 | 11.10 | Sept. | 9.02 | 8.17 | 9.30 | |
| Mar. | 14.46 | 8.92 | 9.00 | 10.90 | Oct. | 8.42 | 8.61 | 9.24 | |
| Apr. | 14.23 | 8.76 | 8.87 | 10.89 | Nov. | 7.96 | 9.08 | 9.73 | |
| May | 13.34 | 8.50 | 9.56 | 10.33 | Dec. | 8.26 | 8.72 | 10.97 | |
| June | 12.70 | 8.38 | 9.88 | 10.72 | Average for Year | 11.44 | 8.66 | 9.46 | |
| July | 12.26 | 8.85 | 9.71 | | | | | | |

# Stocks of Crude Rubber

*(All figures are in long tons)*

## ON HAND OR AFLOAT TO THE U. S.

| End of: | ON HAND 1938 | 1939 | 1940 | AFLOAT 1938 | 1939 | 1940 | ON HAND AND AFLOAT 1938 | 1939 | 1940 |
|---|---|---|---|---|---|---|---|---|---|
| Jan. | 276,497 | 220,727 | 142,368 | 57,356 | 48,210 | 90,285 | 333,853 | 268,937 | 232,653 |
| Feb. | 292,067 | 207,882 | 134,328 | 47,459 | 55,814 | 112,257 | 339,526 | 263,696 | 246,585 |
| Mar. | 301,762 | 201,752 | 142,414 | 41,882 | 55,981 | 113,619 | 343,644 | 257,733 | 256,033 |
| Apr. | 303,901 | 188,074 | 162,459 | 39,071 | 57,918 | 102,557 | 342,972 | 245,992 | 265,016 |
| May | 300,907 | 187,980 | 161,446 | 32,859 | 54,046 | 109,364 | 333,766 | 242,026 | 270,810 |
| June | 294,796 | 173,493 | | 32,079 | 51,274 | | 326,875 | 224,767 | |
| July | 282,785 | 165,450 | | 40,400 | 52,990 | | 323,185 | 218,440 | |
| Aug. | 273,841 | 152,029 | | 47,772 | 66,717 | | 321,613 | 218,746 | |
| Sept. | 268,094 | 136,824 | | 48,927 | 68,310 | | 317,021 | 205,134 | |
| Oct. | 259,074 | 119,404 | | 51,062 | 100,500 | | 310,136 | 219,904 | |
| Nov. | 242,592 | 105,205 | | 51,114 | 114,044 | | 293,706 | 219,249 | |
| Dec. | 231,500 | 125,800 | | 45,105 | 91,095 | | 276,605 | 216,895 | |

## STOCKS IN GREAT BRITAIN

*(No. of Tons in Wharves and Warehouses, not including Latex)*

| At end of | London 1938 | 1939 | 1940 | Liverpool 1938 | 1939 | 1940 |
|---|---|---|---|---|---|---|
| January | 40,203 | 51,420 | 12,000* | 21,711 | 28,789 | 8,000* |
| February | 46,596 | 48,312 | 10,000* | 24,737 | 26,784 | 7,000* |
| March | 50,233 | 46,768 | 10,000* | 26,220 | 24,996 | 8,000* |
| April | 54,296 | 44,760 | 12,000* | 28,277 | 23,742 | 10,000* |
| May | 57,194 | 43,454 | 12,000* | 29,862 | 22,211 | 9,000* |
| June | 60,307 | 42,374 | | 31,837 | 21,176 | |
| July | 62,236 | 37,772 | | 32,825 | 19,116 | |
| August | 65,113 | 28,363 | | 34,315 | 16,218 | |
| September | 63,321 | 24,965* | | 34,645 | 14,054* | |
| October | 59,609 | 23,685* | | 33,483 | 13,336* | |
| November | 57,794 | 23,244* | | 32,116 | 13,087* | |
| December | 55,668 | 19,545* | | 31,012 | 11,006* | |

* Estimated.

*(Figures up to August, 1939, from the Rubber Trade Association of London)*

## STOCKS IN OTHER CENTRES

*(Figures from Statistical Bulletin of the Int'l Rubber Regulation Committee)*

| | Penang and Singapore [1] | Malaya [2] | Ceylon [3] | Holland | Para and Manaos |
|---|---|---|---|---|---|
| At end of 1939 | | | | | |
| January | 30,975 | 59,155 | 4,827 | 198 | 1,557 |
| February | 28,559 | 59,399 | 4,318 | 183 | 1,826 |
| March | 23,255 | 58,005 | 3,389 | 137 | 2,244* |
| April | 22,434 | 55,238 | 3,648 | 131 | 2,209 |
| May | 20,849 | 52,837* | 4,005 | 136 | 1,966 |
| June | 19,563* | 55,834 | 3,771 | 101 | 1,821 |
| July | 27,042 | 55,948 | 4,217 | 188 | 1,474 |
| August | 20,543* | 50,625 | 3,134 | 315 | 1,914 |
| September | 23,457* | 52,755 | 2,742 | ... | 2,682 |
| October | 25,376* | 46,264 | 3,335 | ... | 3,419 |
| November | 22,957* | 45,133 | 5,289 | ... | 4,510 |
| December | 15,299* | 54,868 | 5,149 | ... | 5,336 |
| At end of 1940 | | | | | |
| January | 35,928 | 60,504 | 5,755 | ... | 2,862 |
| February | 33,608 | 52,615 | 4,452 | ... | 2,869 |
| March | 23,874 | 48,180 | 3,369 | ... | 3,246 |

[1] Dealers' and Port Stocks. [2] Inside Regulated Areas. [3] Dealers' Stocks Only. * Revised.

## RUBBER STOCKS AFLOAT

| End of: 1939 | Afloat for United States | Afloat for Europe | All Other * Afloat | Total * Afloat |
|---|---|---|---|---|
| May | 54,046 | 25,700 | 16,254 | 96,000 |
| June | 51,274 | 25,260 | 11,466 | 88,000 |
| July | 52,990 | 31,000 | 21,010 | 105,000 |
| August | 66,717 | 30,000 | 23,283 | 120,000 |
| September | 68,310 | 30,000 | 35,690 | 134,000 |
| October | 100,500 | 35,000 | 37,500 | 173,000 |
| November | 114,044 | 35,000 | 21,956 | 171,000 |
| December | 91,095 | 35,000 | 25,905 | 152,000 |
| End of: 1940 | | | | |
| January | 90,285 | 35,000 | 49,715 | 175,000 |
| February | 112,257 | 40,000 | 40,743 | 193,000 |
| March | 113,619 | 40,000 | 57,381 | 211,000 |
| April | 102,557 | 45,000 | 40,443 | 188,000 |
| May | 109,364 | 45,000 | 55,636 | 210,000 |

* ***Total Afloat*** **is an arbitrary estimate based on 1½ months' shipments as adopted by the Department of Commerce.** ***All Other Afloat*** **is determined by subtracting the amount of stocks in transit to the United States and Europe from the estimated total.**

## TOTAL PRINCIPAL WORLD STOCKS

*(Figures from the Survey of Current Business)*

| At End of: | 1935 | 1936 | 1937* | 1938* | 1939 | 1940 |
|---|---|---|---|---|---|---|
| January | 698,153 | 600,479 | 454,249 | 549,762 | 497,665 | 433,841 |
| February | 686,195 | 599,355 | 445,265 | 565,833 | 479,578 | 429,551 |
| March | 678,809 | 583,318 | 447,856 | 586,666 | 460,723 | 447,472 |
| April | 677,006 | 567,172 | 428,249 | 586,291 | 438,252 | 465,345 |
| May | 677,569 | 541,871 | 413,134 | 568,158 | 429,979 | 470,981 |
| June | 671,525 | 520,255 | 434,250 | 573,136 | 407,640 | ..... |
| July | 679,061 | 519,074 | 445,782 | 580,654 | 418,639 | ..... |
| August | 680,644 | 500,520 | 457,462 | 565,394 | 397,345 | ..... |
| September | 661,509 | 493,585 | 470,768 | 551,447 | 396,867 | ..... |
| October | 655,000 | 486,159 | 479,398 | 540,976 | 413,274* | ..... |
| November | 617,300 | 466,491 | 493,266 | 512,196 | 395,217 | ..... |
| December | 613,987 | 466,576 | 545,533 | 482,852 | 391,125 | ..... |
| Monthly Avge. | 666,397 | 528,738 | 460,022 | 555,280 | 427,192 | ..... |

* Revised.

# U. S. Tire and Tube Statistics[1]

*(All Figures Represent Thousands)*

## AUTOMOBILE CASINGS

Production Figures on Quarterly Basis

| Quarter | 1933 | 1934 | 1935 | 1936 | 1937 | 1938 | 1939 | 1940 |
|---|---|---|---|---|---|---|---|---|
| Jan.-Mar. | 6,635 | 13,437 | 13,355 | 11,376 | 15,565 | 7,314 | 13,946 | 14,849 |
| Apr.-June | 14,412 | 13,565 | 12,597 | 14,892 | 15,834 | 7,380 | 13,759 | ..... |
| July-Sept. | 14,707 | 9,822 | 11,312 | 14,914 | 12,207 | 10,794 | 15,182 | ..... |
| Oct.-Dec. | 9,550 | 10,406 | 12,099 | 14,858 | 9,704 | 12,360 | 14,726 | ..... |
| Total | 45,304 | 47,230 | 49,363 | 56,040 | 53,310 | 37,848 | 57,613 | ..... |

Shipment Figures on Quarterly Basis

| Quarter | 1933 | 1934 | 1935 | 1936 | 1937 | 1938 | 1939 | 1940 |
|---|---|---|---|---|---|---|---|---|
| Jan.-Mar. | 6,981 | 10,730 | 11,154 | 10,554 | 14,143 | 7,388 | 12,445 | 12,728 |
| Apr.-June | 15,139 | 14,998 | 13,473 | 15,940 | 15,741 | 9,564 | 15,107 | ..... |
| July-Sept. | 13,707 | 11,648 | 13,489 | 14,037 | 13,106 | 11,243 | 15,791 | ..... |
| Oct.-Dec. | 8,265 | 9,310 | 12,066 | 12,855 | 10,495 | 12,098 | 14,165 | ..... |
| Total | 44,092 | 46,686 | 50,182 | 53,386 | 53,485 | 40,293 | 57,508 | ..... |

Inventory Figures [2]

| Quarter | 1933 | 1934 | 1935 | 1936 | 1937 | 1938 | 1939 | 1940 |
|---|---|---|---|---|---|---|---|---|
| Jan.-Mar. | 7,290 | 11,651 | 11,675 | 8,762 | 12,004 | 10,547 | 9,963 | 10,747 |
| Apr.-June | 6,615 | 10,219 | 10,755 | 7,556 | 12,081 | 8,337 | 8,632 | ..... |
| July-Sept. | 7,595 | 8,419 | 8,288 | 8,690 | 11,200 | 7,859 | 8,080 | ..... |
| Oct.-Dec. | 8,888 | 9,455 | 8,196 | 10,717 | 10,383 | 8,166 | 8,665 | ..... |

### Figures for Recent Months

| | PRODUCTION 1938 | 1939 | 1940 | SHIPMENTS 1938 | 1939 | 1940 | INVENTORY [2] 1938 | 1939 | 1940 |
|---|---|---|---|---|---|---|---|---|---|
| Apr. | 2,706 | 4,310 | 5,106 | 3,211 | 4,458 | 5,010 | 10,141 | 9,813 | 10,881 |
| May | 2,711 | 4,473 | 5,415 | 3,346 | 4,800 | 5,720 | 9,521 | 9,540 | 10,576 |
| June | 3,091 | 4,976 | | 3,979 | 5,849 | | 8,470 | 8,632 | |

## AUTOMOBILE INNER TUBES

Production Figures on Quarterly Basis

| Quarter | 1933 | 1934 | 1935 | 1936 | 1937 | 1938 | 1939 | 1940 |
|---|---|---|---|---|---|---|---|---|
| Jan.-Mar. | 6,230 | 12,823 | 12,553 | 11,891 | 15,831 | 7,314 | 12,383 | 12,815 |
| Apr.-June | 13,001 | 13,191 | 11,631 | 14,624 | 15,413 | 7,380 | 11,847 | ..... |
| July-Sept. | 14,356 | 10,321 | 11,270 | 15,320 | 12,038 | 10,794 | 13,118 | ..... |
| Oct.-Dec. | 9,000 | 9,891 | 12,425 | 15,201 | 9,092 | 12,360 | 13,300 | ..... |
| Total | 42,587 | 46,226 | 47,879 | 57,036 | 52,374 | 37,848 | 50,648 | ..... |

Shipment Figures on Quarterly Basis

| Quarter | 1933 | 1934 | 1935 | 1936 | 1937 | 1938 | 1939 | 1940 |
|---|---|---|---|---|---|---|---|---|
| Jan.-Mar. | 6,539 | 10,640 | 11,252 | 11,367 | 14,606 | 7,387 | 11,422 | 11,684 |
| Apr.-June | 13,292 | 14,553 | 11,928 | 15,113 | 15,495 | 9,564 | 13,010 | ..... |
| July-Sept. | 13,370 | 11,545 | 13,251 | 15,069 | 12,901 | 11,243 | 13,449 | ..... |
| Oct.-Dec. | 8,189 | 8,306 | 11,636 | 12,874 | 9,765 | 12,099 | 13,309 | ..... |
| Total | 41,390 | 45,044 | 48,067 | 54,423 | 52,767 | 40,293 | 51,190 | ..... |

Inventory Figures [2]

| Quarter | 1933 | 1934 | 1935 | 1936 | 1937 | 1938 | 1939 | 1940 |
|---|---|---|---|---|---|---|---|---|
| Jan.-Mar. | 6,369 | 10,244 | 10,406 | 8,660 | 11,993 | 10,547 | 8,752 | 8,247 |
| Apr.-June | 6,097 | 8,795 | 10,050 | 8,075 | 11,833 | 8,337 | 7,549 | ..... |
| July-Sept. | 7,008 | 7,639 | 7,565 | 8,595 | 11,326 | 7,859 | 7,206 | ..... |
| Oct.-Dec. | 7,815 | 9,180 | 8,231 | 10,945 | 10,312 | 8,166 | 7,036 | ..... |

### Figures for Recent Months

| | PRODUCTION 1938 | 1939 | 1940 | SHIPMENTS 1938 | 1939 | 1940 | INVENTORY [2] 1938 | 1939 | 1940 |
|---|---|---|---|---|---|---|---|---|---|
| Apr. | 2,258 | 3,852 | 4,618 | 2,860 | 3,940 | 4,543 | 9,917 | 8,653 | 8,258 |
| May | 2,325 | 3,746 | 4,739 | 2,974 | 4,034 | 4,739 | 9,265 | 8,373 | 8,243 |
| June | 2,797 | 4,249 | | 3,730 | 5,036 | | 8,337 | 7,549 | |

[1] These figures are based on reports received from the Rubber Manufacturers Association. They are revised frequently and the latest available issue should be consulted for most reliable figures.

[2] Stocks held by manufacturers at end of period indicated.

# Automobile Production

| Year | United States Total | Passenger Cars | Trucks | Canada Total | Passenger Cars | Trucks | Grand Total |
|---|---|---|---|---|---|---|---|
| 1929 | 5,358,420 | 4,587,400 | 771,020 | 263,295 | 207,498 | 55,797 | 5,621,715 |
| 1930 | 3,355,986 | 2,814,452 | 540,534 | 154,192 | 125,442 | 28,750 | 3,510,178 |
| 1931 | 2,389,730 | 1,973,090 | 416,640 | 82,621 | 63,477 | 19,144 | 2,472,351 |
| 1932 | 1,370,678 | 1,135,493 | 235,187 | 60,816 | 50,718 | 10,098 | 1,431,494 |
| 1933 | 1,920,057 | 1,573,512 | 346,545 | 65,924 | 53,855 | 12,069 | 1,992,126 |
| 1934 | 2,753,111 | 2,177,919 | 575,192 | 116,852 | 92,647 | 24,205 | 2,869,963 |
| 1935 | 3,946,934 | 3,252,244 | 694,690 | 172,877 | 135,562 | 37,315 | 4,119,811 |
| 1936 | 4,454,115 | 3,669,528 | 784,587 | 162,159 | 128,369 | 33,790 | 4,616,274 |
| 1937 | 4,808,974 | 3,915,889 | 893,085 | 207,463 | 153,046 | 54,417 | 5,016,437 |
| 1938 | 2,489,085 | 2,000,985 | 488,100 | 166,086 | 123,761 | 42,325 | 2,655,171 |
| 1939* | 3,577,292 | 2,866,796 | 710,496 | 155,316 | 108,806 | 46,510 | 3,732,608 |
| 1939 | | | | | | | |
| Oct.* | 313,392 | 251,819 | 61,573 | 11,296 | 7,791 | 3,505 | 324,688 |
| Nov.* | 351,785 | 285,252 | 66,533 | 16,756 | 9,882 | 6,874 | 368,541 |
| Dec.* | 452,142 | 373,804 | 78,338 | 16,978 | 11,491 | 5,487 | 469,120 |
| 1940 | | | | | | | |
| Jan.* | 432,279 | 362,897 | 69,382 | 17,213 | 12,579 | 4,634 | 449,492 |
| Feb.* | 404,032 | 337,756 | 66,276 | 18,193 | 12,779 | 5,414 | 422,225 |
| Mar.* | 423,620 | 352,922 | 70,698 | 16,612 | 12,025 | 4,587 | 440,232 |
| Apr. | 432,746 | 362,139 | 70,607 | 19,687 | 13,487 | 6,200 | 452,433 |
| May | 391,215 | 325,676 | 65,539 | 21,277 | 12,677 | 8,600 | 412,492 |
| June | ..... | ..... | ..... | ..... | ..... | ..... | ..... |

* Revised.

Note: U. S. figures represent factory sales; Canadian figures represent production.

ADVERTISING PAGES REMOVED

# Exports of Crude Rubber from Principal Producing Countries

**(Long Tons)**

| | BRITISH MALAYA [1] | | | | | | | NETHERLAND INDIES [4] | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Exports | Imports | Net Exports | Ceylon [2] | India & Burma [3] | Sarawak [3] | British North Borneo [3] | Thailand [3] | Java & Madura | Sumatra E. Coast | Other N. I. | Indo-China [3] | Amazon Valley | All Other [5] | World Total [6] |
| 1923 | 252,016 | 70,432 | 181,584 | 39,971 | 6,416 | 5,705 | 4,237 | 1,718 | 32,930 | 46,344 | 57,822 | 5,067 | 16,765 | 7,856 | 406,415 |
| 1924 | 259,706 | 108,524 | 151,182 | 39,997 | 7,697 | 6,699 | 4,621 | 2,962 | 42,446 | 54,497 | 80,347 | 6,688 | 23,165 | 9,065 | 429,366 |
| 1925 | 316,825 | 158,022 | 158,803 | 49,566 | 10,082 | 5,424 | 5,377 | 5,377 | 46,757 | 65,499 | 120,626 | 7,881 | 25,298 | 13,797 | 514,487 |
| 1926 | 391,328 | 151,243 | 240,085 | 58,962 | 9,874 | 9,155 | 6,079 | 4,027 | 52,186 | 71,413 | 121,231 | 8,203 | 24,298 | 16,017 | 621,536 |
| 1927 | 371,322 | 182,845 | 188,477 | 55,35e | 11,321 | 10,923 | 6,58[illegible] | 5,472 | 55,297 | 77,815 | 142,171 | 8,645 | 28,782 | 15,633 | 606,474 |
| 1928 | 409,430 | 149,787 | 259,643 | 57,267 | 10,790 | 10,087 | 6,698 | 4,813 | 58,848 | 82,511 | 121,770 | 9,548 | 21,129 | 10,690 | 653,794 |
| 1929 | 574,836 | 163,092 | 411,744 | 81,384 | 11,663 | 11,077 | 7,381 | 5,018 | 65,990 | 87,789 | 134,037 | 9,696 | 21,148 | 6,767 | 853,894 |
| 1930 | 547,043 | 133,876 | 413,167 | 76,970 | 10,782 | 10,309 | 6,781 | 4,251 | 69,755 | 79,396 | 115,254 | 7,665 | 14,260 | 5,651 | 814,241 |
| 1931 | 519,740 | 125,506 | 394,234 | 61,769 | 8,470 | 10,451 | 6,247 | 4,218 | 75,952 | 87,747 | 116,009 | 11,696 | 12,121 | 3,292 | 792,203 |
| 1932 | 478,252 | 92,539 | 385,713 | 48,973 | 3,888 | 6,960 | 4,664 | 3,451 | 61,312 | 79,837 | 85,871 | 13,883 | 6,450 | 1,816 | 702,818 |
| 1933 | 573,412 | 167,377 | 406,035 | 63,351 | 4,527 | 10,874 | 7,555 | 7,765 | 73,851 | 91,861 | 149,659 | 18,394 | 9,883 | 2,737 | 846,312 |
| 1934 | 677,361 | 211,803 | 465,558 | 79,746 | 10,492 | 17,233 | 11,103 | 17,545 | 87,400 | 112,058 | 175,470 | 20,170 | 8,903 | 2,985 | 1,008,663 |
| 1935 | 590,319 | 174,652 | 415,667 | 54,316 | 13,968 | 19,465 | 8,885 | 28,327 | 57,488 | 78,325 | 139,297 | 28,816 | 11,275 | 8,745 | 864,574 |
| 1936 | 520,286 | 167,799 | 352,487 | 49,692 | 14,724 | 21,243 | 8,177 | 33,702 | 61,307 | 84,577 | 152,205 | 40,782 | 14,193 | 11,466 | 845,431 |
| 1937 | 681,618 | 213,446 | 468,192 | 70,353 | 17,015 | 25,922 | 13,213 | 5,551 | 84,085 | 139,632 | 207,863 | 43,399 | 15,576 | 13,063 | 1,133,864 |
| 1938 | 526,911 | 156,101 | 370,810 | 49,528 | 15,178 | 17,792 | 9,512 | 41,080 | 57,526 | 94,501 | 145,909 | 58,518 | 14,618 | 12,920 | 887,892 |
| 1939 | 553,324 | 177,851 | 375,473 | 61,026 | 15,881 | 24,014 | 11,864 | 41,266 | 72,786 | 117,791 | 181,272 | 65,140 | 13,892 | 22,224 | 1,002,629 |
| 1939: | | | | | | | | | | | | | | | |
| Mar. | 43,259 | 14,035 | 29,224 | 3,718 | 1,392 | 1,177 | 344 | 5,401 | 5,361 | 8,048 | 14,487 | 4,636 | 1,331 | 1,776 | 76,932 |
| Apr. | 43,658 | 13,996 | 29,662 | 2,225 | 1,260 | 2,446 | 1,687 | 2,660 | 5,321 | 9,250 | 13,768 | 2,581 | 1,139 | 1,753 | 73,751 |
| May | 42,214 | 12,697 | 29,517 | 2,805 | 1,670 | 1,649 | 558 | 2,782 | 4,105 | 8,168 | 12,155 | 4,585 | 874 | 1,672 | 70,540 |
| June | 31,541 | 9,567 | 21,974 | 3,708 | 1,435 | 1,157 | 332 | 1,748 | 5,839 | 8,846 | 12,824 | 4,030 | 591 | 1,825 | 64,309 |
| July | 45,962 | 20,052 | 25,910 | 5,019 | 1,285 | 3,092 | 1,603 | 5,599 | 5,229 | 11,020 | 19,431 | 3,367 | 1,019 | 1,804 | 84,378 |
| Aug. | 53,497 | 12,635 | 40,862 | 5,620 | 416 | 1,749 | 975 | 5,230 | 6,236 | 10,010 | 11,232 | 7,020 | 1,197 | 1,525 | 92,072 |
| Sept. | 45,094 | 18,302 | 26,792 | 6,064 | 780 | 1,932 | 429 | 4,670 | 5,168 | 10,278 | 22,270 | 5,943 | 1,131 | 1,832 | 87,289 |
| Oct. | 70,839 | 21,493 | 49,346 | 5,234 | 815 | 2,487 | 1,730 | 2,047 | 9,950 | 13,645 | 21,404 | 5,022 | 1,414 | 2,185 | 115,279 |
| Nov. | 49,276 | 13,657 | 35,619 | 4,405 | 819 | 2,023 | 1,322 | 1,428 | 5,827 | 10,239 | 14,163 | 6,540 | 1,055 | 2,191 | 85,631 |
| Dec. | 41,568 | 8,479 | 33,089 | 9,496 | 2,565 | 2,476 | 616 | 1,177 | 8,130 | 8,580 | 7,156 | 11,018 | 1,377 | 2,052 | 87,732 |
| 1940: | | | | | | | | | | | | | | | |
| Jan. | 56,214 | 30,136 | 26,078 | 7,091 | 1,630 | 1,987 | 1,858 | 5,469 | 6,361 | 16,070 | 31,676 | 5,315 | 1,777 | 2,000* | 107,212 |
| Feb. | 62,105 | 16,598 | 45,507 | 8,741 | 2,076 | 2,678 | 1,164 | 3,887 | 7,270 | 14,873 | 15,713 | 7,040 | 1,781 | 2,000* | 112,376 |
| Mar. | 65,269 | 17,565 | 47,704 | 5,406 | 2,054 | 3,526 | 1,050 | 3,111 | 8,864 | 13,415 | 20,015 | 3,551 | 1,298 | 2,000* | 111,994 |
| Apr. | 47,430 | 22,106 | 25,324 | 4,309 | 2,173 | 2,951 | 1,799 | 1,834 | 7,703 | 12,759 | 23,815 | 4,000* | 1,582 | 2,000* | 90,279 |
| May | 74,682 | 16,946 | 57,736 | 7,274 | 2,229 | 2,696 | 1,370 | 2,000* | 8,416 | 11,904 | 20,009 | 4,000* | 3,413 | 2,000* | 121,047 |

All figures from January, 1934, onward are net exports shown on a "dry rubber" basis as calculated by the International Rubber Regulation Committee. (1) Prior to January, 1934, Malayan net exports cannot be taken as production, since imported rubber is largely wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex also is not included in the early years, which on a dry rubber basis was as follows: 1924—1,117 tons; 1925—3,618; 1926—3,263; 1927—2,439; 1928—2,247; 1929—3,574; 1930—2,750; 1931—1,940; 1932—5,193; 1933—10,470, and 1934—14,172 tons. (2) Ceylon Chamber of Commerce statistics until 1926; rubber exported as latex is not included—such shipments on a dry rubber basis were: 1923—18 tons; 1924—90; 1925—6; 1926—20; 1927—½; 1928—1; 1929—2; 1930—11; 1931—2; 1932—2; 1933—1, and 1934—6 tons. (3) Official statistics. (4) Exports from "Other N. I." are chiefly wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included in earlier years, which is as follows on a dry rubber basis: 1923—2,342 tons; 1924—1,008; 1925—2,239; 1926—44; 1927—84; 1928—1,395; 1929—437; 1930—2,744; 1931—3,874; 1932—3,488; 1933—5,260, and 1934—5,330 tons. (5) Calculated from official import statistics of principal consuming countries; also includes United States imports of guayule. (6) This total includes the third column for British Malaya and all other figures shown for other territories. (*) Figure is provisional.

NOTE: ANNUAL FIGURES ARE MORE ACCURATE: THEY ARE REVISED AT THE END OF THE FOLLOWING YEAR.

# Net Imports of Crude Rubber into Principal Manufacturing Countries

***(Long Tons)***

| | United States [1] | United Kingdom | France (h) | Germany | Canada (ac) | Japan (da) | Italy | Russia (ce) | Australia (cd) | Belgium (d) | Netherlands | Scandinavia (abcdf) | Spain (g) | Czechoslovakia (abcd) | World Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1919 | 238,407 | 42,671 | 17,685 | 5,584 | 6,395 | 9,753 | 9,894 | 75 | 1,002 | 3,995 | 2,771 | 3,149 | 2,418 | 9 | 343,808 |
| 1920 | 249,530 | 56,844 | 13,885 | 11,890 | 11,746 | 5,297 | 6,123 | 62 | 1,815 | 3,840 | 5,510 | 2,292 | 2,008 | 567 | 371,409 |
| 1921 | 179,736 | 42,087 | 15,135 | 21,920 | 8,124 | 21,713 | 3,906 | 165 | 1,014 | 1,705 | 1,022 | 1,279 | 2,245 | 569 | 300,620 |
| 1922 | 296,594 | 11,724 | 24,352 | 27,546 | 9,207 | 15,934 | 6,430 | 2,493 | 2,043 | 172 | —3,807 | 1,778 | 589 | 567 | 396,222 |
| 1923 | 301,527 | 12,700 | 27,392 | 18,519 | 13,277 | 15,372 | 8,489 | 2,986 | 1,649 | 2,184 | 792 | 2,528 | 630 | 1,128 | 409,173 |
| 1924 | 319,103 | —11,550 | 30,446 | 22,727 | 14,299 | 19,571 | 8,764 | 2,346 | 3,124 | 2,688 | —807 | 3,178 | 944 | 1,370 | 416,203 |
| 1925 | 385,596 | 4,061 | 32,956 | 33,937 | 19,683 | 11,117 | 11,412 | 7,088 | 4,757 | 2,930 | 873 | 3,149 | 1,155 | 1,558 | 520,274 |
| 1926 | 399,981 | 84,865 | 34,240 | 22,775 | 20,229 | 18,125 | 9,809 | 6,529 | 9,021 | 2,498 | 2,670 | 4,046 | 1,299 | 1,870 | 617,957 |
| 1927 | 403,472 | 60,249 | 34,271 | 38,892 | 26,405 | 20,521 | 11,381 | 12,018 | 9,490 | 6,482 | 636 | 4,224 | 2,055 | 2,672 | 632,768 |
| 1928 | 407,572 | 4,846 | 36,498 | 37,855 | 30,447 | 25,621 | 12,433 | 15,134 | 8,430 | 7,958 | 2,243 | 4,418 | 3,178 | 3,138 | 599,771 |
| 1929 | 528,608 | 122,675 | 55,093 | 49,275 | 35,453 | 34,284 | 17,169 | 11,774 | 15,886 | 9,445 | 3,022 | 6,440 | 864 | 4,650 | 894,638 |
| 1930 | 458,036 | 120,069 | 68,503 | 45,488 | 28,793 | 33,039 | 18,639 | 16,387 | 5,354 | 10,635 | 2,924 | 7,710 | 2,400 | 4,468 | 822,445 |
| 1931 | 475,993 | 86,170 | 46,466 | 39,688 | 25,261 | 43,483 | 10,149 | 30,671 | 7,649 | 11,009 | 2,220 | 6,360 | 2,605 | 7,717 | 794,641 |
| 1932 | 393,844 | 44,086 | 42,506 | 45,121 | 20,917 | 56,027 | 14,469 | 30,637 | 12,576 | 9,519 | 2,851 | 7,262 | 4,359 | 9,444 | 693,618 |
| 1933 | 398,365 | 73,335 | 61,953 | 54,120 | 19,332 | 66,831 | 19,341 | 29,830 | 13,534 | 11,166 | 1,243 | 7,831 | 5,520 | 10,402 | 772,803 |
| 1934 | 439,172 | 158,482 | 49,560 | 59,330 | 28,439 | 69,905 | 21,398 | 47,271 | 9,642 | 9,115 | 3,758 | 12,418 | 6,900 | 10,999 | 926,389 |
| 1935 | 455,758 | 128,829 | 51,450 | 62,899 | 26,870 | 57,567 | 21,880 | 37,572 | 9,978 | 7,593 | 4,068 | 11,878 | 8,140 | 11,245 | 895,727 |
| 1936 | 475,359 | —2,591 | 57,032 | 71,794 | 27,871 | 61,223 | 16,534 | 30,967 | 14,109 | 9,648 | 2,888 | 11,236 | 6,668 | 8,772 | 791,510 |
| 1937 | 592,394 | 92,707 | 59,871 | 98,170 | 36,088 | 62,311 | 24,733 | 30,462 | 19,164 | 14,970 | 4,343 | 4,680 | 2,400 | 13,063 | 1,055,356 |
| 1938 | 406,343 | 133,079 | 59,660 | 90,200 | 25,696 | 45,836 | 28,170 | 25,650 | 11,944 | 11,309 | 5,092 | 16,034 | 2,400 | 9,936 | 871,349 |
| 1939: | | | | | | | | | | | | | | | |
| Feb. | 30,578 | 4,773 | 5,315 | 7,569 | 1,451 | 3,263 | 2,025 | 2,000* | 1,741 | 1,068 | 184 | 858 | 200* | 524 | 61,549 |
| Mar. | 45,286 | 8,082 | 4,503 | 8,036 | 2,458 | 4,019 | 1,525 | 2,000* | 1,316 | 1,242 | 368 | 1,133 | 200* | 463 | 80,631 |
| Apr. | 31,590 | 4,752 | 5,639 | 8,719 | 1,466 | 3,579 | 1,926 | 2,000* | 1,108 | 855 | 333 | 1,062 | 200* | 597 | 63,826 |
| May | 45,390 | 7,531 | 4,646 | 8,413 | 3,006 | 4,438 | 1,573 | 2,000* | 1,188 | 792 | 518 | 1,654 | 200* | 618 | 81,967 |
| June | 33,951 | 8,439 | 4,649 | 8,190 | 2,423 | 3,067 | 1,992 | 2,000* | 1,308 | 621 | 672 | 2,703 | 200* | 487 | 70,702 |
| July | 36,932 | 4,040 | 4,282 | 8,437 | 3,164 | 3,668 | 1,350 | 1,000* | 1,422 | 859 | 565 | 824 | 200* | 412 | 67,155 |
| Aug. | 38,319 | 2,044 | 4,000* | .... | 2,033 | 3,145 | 1,500* | 2,000* | 2,182 | 952 | 651 | 1,546 | 200* | 400* | 58,972 |
| Sept. | 36,197 | 4,406 | 4,000* | .... | 2,639 | 9,254 | 1,500* | 2,000* | 875 | 108 | 222 | 1,200* | 200* | ... | 63,572 |
| Oct. | 39,735 | 8,530 | 5,000* | .... | 5,787 | 2,749 | 1,500* | 2,000* | 1,235 | 519 | 653 | 1,200* | 200* | ... | 69,589 |
| Nov. | 41,478 | 10,500* | 5,000* | .... | 1,709 | 5,104 | 1,500* | 2,000* | 1,200* | 667 | 613 | 1,200* | 200* | ... | 71,504 |
| Dec. | 70,302 | 5,200* | 5,000* | .... | 3,025 | 3,961 | 1,500* | 2,000* | 1,200* | 1,035 | 1,827 | 1,200* | 200* | ... | 94,702 |
| 1940: | | | | | | | | | | | | | | | |
| Jan. | 71,341 | 450 | 5,000* | .... | 5,047 | 4,540 | 1,500* | 2,000* | 1,200* | 891 | 682 | 1,200* | 200* | ..... | ..... |
| Feb. | 41,797 | 7,500 | 5,000* | .... | 3,508 | 5,241 | .... | ..... | ..... | 694 | 495 | 1,200* | 200* | ..... | ..... |
| Mar. | 58,282 | 14,200 | .... | .... | 3,062 | 6,057 | .... | ..... | ..... | ..... | 627 | ..... | ..... | ..... | ..... |
| Apr. | 70,135 | 16,400 | .... | .... | 3,096 | .... | .... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| May | 50,621 | 10,000 | .... | .... | .... | .... | .... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |

a—Including gutta percha. b—Including balata. c—Re-exports not deducted in monthly statistics. d—Including some scrap and reclaimed rubber. e—Official statistics of rubber imports by Soviet Russia. f—Including Norway, Sweden, Denmark and Finland. g—United Kingdom and French exports to Spain except in years prior to 1925. h—French imports have been reduced in order to eliminate imports of gutta percha and to reduce to basis of net weight. [1]—United States imports of guayule are included in this compilation. *—Figure is provisional; final figure will be shown when available.

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